

McCarthy, R. J.
1948

The Bernreuter personality inventory and neuropsychiatric
disabilities.

BOSTON UNIVERSITY
SCHOOL OF EDUCATION

LIBRARY

Ed.
Thesis
McCarthy, R. J.
1948

The Gift of Robert J. McCarthy

Thesis
McCarthy, R.J.
1948

Stored

ep - 1

BOSTON UNIVERSITY
SCHOOL OF EDUCATION

Thesis

THE BERNREUTER PERSONALITY INVENTORY
AND NEUROPSYCHIATRIC DISABILITIES

Submitted by

Robert J. McCarthy

(B.S. in Ed., Boston University, 1943)

In partial fulfillment of requirements
for the degree of Master of Education

1948

First Reader: William C. Kvaraceus, Associate Professor of Education

Second Reader: Elmer B. Mode, Professor of Mathematics

Third Reader: J. Wendell Yeo, Professor of Education

Gift of R.J. McCarthy
School of Education
June 18, 1948
29472

TABLE OF CONTENTS

PAGE	PAGE
1. STATEMENT OF THE PROBLEM AND JUSTIFICATION.....	1
Acknowledgement	1
Introduction.....	1
The writer expresses sincere appreciation to the members of the faculty who have shown interest in the academic progress of the writer and have made this paper possible: to Dr. William C. Kvaraceus for the direction he has offered in all educational and professional pursuits and in accomplishing this research; to Professor Elmer B. Mode for the individual instruction he has given concerning the statistical design of this study; to Dr. J. Wendell Yeo for guiding the writer into the field of Research and Measurement.	19
Random Sampling of the Criterion Population.....	19
The Chi Square Test.....	20
Student's t Test.....	22
Snedecor's F Test.....	27
The Analysis of Variance.....	28
17. PRESENTATION OF DATA.....	30
Probabilities of Association.....	30
Differences between Variations.....	36

Acknowledgment

The writer expresses sincere appreciation to the members of the faculty who have shown interest in the academic progress of the writer and have made this paper possible; to Dr. William C. Karschner for the direction he has offered in all educational and professional pursuits and in accomplishing this research; to Professor Elmer E. Hode for the individual instruction he has given concerning the statistical design of this study; to Dr. J. Wendell Yee for guiding the writer into the field of Research and Measurement.

TABLE OF CONTENTS

CHAPTER		PAGE
I.	STATEMENT OF THE PROBLEM AND JUSTIFICATION..	1
	Introduction.....	1
	Purpose of this Study.....	2
	Justification for this Study.....	2
II.	REVIEW OF THE RESEARCH AND DESCRIPTION OF THE SAMPLE OF THIS STUDY.....	5
	Reviewing the Literature of General Personality Evaluation.....	5
	Reviewing the Literature pertaining to the Bernreuter Personality Inventory.....	10
	Description of the Personality Inventory..	15
	Description of the Sample.....	17
III.	PROCEDURES.....	19
	Random Sampling of the Criterion Population.....	19
	The Chi Square Test.....	22
	Student's t Test.....	25
	Snedecor's F Test.....	27
	The Analysis of Variance.....	28
IV.	PRESENTATION OF DATA.....	30
	Probabilities of Association.....	30
	Differences between Variances.....	36

TABLE OF CONTENTS

PAGE	CHAPTER
I.	STATEMENT OF THE PROBLEM AND JUSTIFICATION..
1	Introduction.....
1	Purpose of this Study.....
2	Justification for this Study.....
2	REVIEW OF THE RESEARCH AND DESCRIPTION OF
THE SAMPLE OF THIS STUDY.....	II.
3	Reviewing the Literature of General
Personality Evaluation.....	3
Reviewing the Literature pertaining to	
the Minnesota Personality Inventory.....	10
Description of the Personality Inventory..	15
Description of the Sample.....	17
PROCEDURES.....	19
Random Sampling of the Population	
Population.....	19
The Chi Square Test.....	22
Student's t Test.....	25
Shepherd's F Test.....	27
The Analysis of Variance.....	28
PRESENTATION OF DATA.....	IV.
Probabilities of Association.....	30
Differences between Variances.....	32

TABLE OF CONTENTS

CHAPTER	PAGE
IV. PRESENTATION OF DATA (Cont.)	
Differences between Means.....	39
V. SUMMARY, CONCLUSIONS AND	
LIMITATIONS OF THIS STUDY.....	42
Summary.....	42
Conclusions.....	45
Limitations of this Study and the Need for Further Research.....	46
BIBLIOGRAPHY.....	49
APPENDIX.....	51

TABLE OF CONTENTS

PAGE	CHAPTER
	IV. PRESENTATION OF DATA (Cont.)
39	Differences between Means.....
	V. SUMMARY, CONCLUSIONS AND
42	LIMITATIONS OF THIS STUDY.....
42	Summary.....
42	Conclusions.....
46	Limitations of this Study and The Need for Further Research.....
49	BIBLIOGRAPHY.....
51	APPENDIX.....

LIST OF TABLES

TABLE		PAGE
1.	Comparison of Male World War II Veterans rated for Varying Degrees of Neuroticism and Percentile Ranks with respect to the B1N Scale of the Bernreuter Personality Inventory.....	32
2.	Comparison of Male World War II Veterans rated for Varying Degrees of Neuroticism and Percentile Ranks with respect to the FLC Scale of the Bernreuter Personality Inventory.....	34
3.	Raw Scores obtained on the B1N Scale of the Bernreuter Personality Inventory by 93 Male World War II Veterans rated for Neuropsychiatric Disabilities of Varying Degrees of Severity.....	37
4.	The Analysis of Variance of the B1N Raw Scores of 10, 30, and 50 per cent Neuropsychiatric Groups.....	38

LIST OF TABLES

PAGE

TABLE

22	Comparison of Male World War II Veterans rated for Varying Degrees of Neuroticism and Percentile Ranks with respect to the BIN Scale of the Bernreuter Personality Inventory.....	1.
24	Comparison of Male World War II Veterans rated for Varying Degrees of Neuroticism and Percentile Ranks with respect to the BIN Scale of the Bernreuter Personality Inventory.....	2.
27	Raw Scores obtained on the BIN Scale of the Bernreuter Personality Inventory by 62 Male World War II Veterans rated for Neuropsychiatric Disabilities of Varying Degrees of Severity.....	3.
28	The Analysis of Variance of the BIN Raw Scores of 10, 20, and 30 percent Neuropsychiatric Groups.....	4.

CHAPTER I

STATEMENT OF THE PROBLEM AND JUSTIFICATION

Introduction

Today, with measurement of personality an integral part of most testing programs and with the acute necessity for a valid method of differentiating between the thousands of veterans with structural or functional disabilities as compared with those whose disabilities are psychogenic in origin, the need for an instrument which actually measures what it purports to measure is paramount. The advocates of the projective techniques of personality evaluation state that they are meeting this need. However, the global procedures of objective personality evaluation are sufficiently complicated and time consuming as to make their universal use impractical, at this time. The more popular use of non projective, group testing as a method of personality measurement necessitates an instrument of unquestionable validity. Such an instrument must yield valid results for the specific situation in which it is used. Until personality test validation studies are available for specific evaluation purposes, the users of personality tests must accept the general interpretations of

CHAPTER I

STATEMENT OF THE PROBLEM AND JUSTIFICATION

Introduction

Today, with measurement of personality an integral part of most testing programs and with the acute necessity for a valid method of differentiating between the thousands of veterans with structural or functional disabilities as compared with those whose disabilities are psychogenic in origin, the need for an instrument which actually measures what it purports to measure is paramount. The advocates of the projective techniques of personality evaluation state that they are meeting this need. However, the global procedures of objective personality evaluation are sufficiently complicated and time consuming as to make their universal use impractical at this time. The more popular use of non projective, group testing as a method of personality measurement necessitates an instrument of unquestionable validity. Such an instrument must yield valid results for the specific situation in which it is used. Until personality test validation studies are available for specific evaluation purposes, the users of personality tests must accept the general interpretations of

personality tests as being equally applicable to the specific situation in which they are interested.

Purpose of this Study

The principal purpose of this study is to examine and analyze the B1N and F1C scales of the Bernreuter Personality Inventory to determine their effectiveness in measuring neurotic tendency in male veterans of World War II.

Justification for this Study

The justification for this study is based on three problems posed by psychologists interested in the personality evaluation of veterans: (1) the acute need for a valid instrument to measure personality traits of the increasing population of neuropsychiatric veterans, (2) the general need for validity studies of all existing instruments of personality evaluation and (3) the specific need for such a study of the Bernreuter Personality Inventory due to its popular though controversial use.

Extensive literature and courses of study made available during the war brought to the collective mind of the general public the idea that many of the healthy men who left home to fight for God and country would return as veterans, sick in mind and body. The necessity of helping these veterans to readjust to the complications of modern society has been accepted by a sympathetic public. However, the vast number

personality tests as being equally applicable to the specific situation in which they are interested.

Purpose of this Study

The principal purpose of this study is to examine and analyze the B1N and B1C scales of the Bernreuter Personality Inventory to determine their effectiveness in measuring neurotic tendency in male veterans of World War II.

Justification for this Study

The justification for this study is based on three problems posed by psychologists interested in the personality evaluation of veterans: (1) the acute need for a valid instrument to measure personality traits of the increasing population of neuropsychiatric veterans, (2) the general need for validity studies of all existing instruments of personality evaluation and (3) the specific need for such a study of the Bernreuter Personality Inventory due to its popular though controversial use.

Extensive literature and courses of study made available during the war brought to the collective mind of the general public the idea that many of the healthy men who left home to fight for God and country would return as veterans, sick in mind and body. The necessity of helping these veterans to readjust to the complications of modern society has been accepted by a sympathetic public. However, the vast number

of veterans in need of psychiatric guidance is probably well beyond the average lay persons expectations and the potential value of an instrument for detecting those who are emotionally maladjusted may be suggested by the following report by Greer Williams,^{1/} special consultant to the Veterans Administration.

The living veterans of World War I and II total around 18,000,000. Nearly 525,000 of them are drawing pensions for neuropsychiatric disability, meaning they have some kind of mental or nervous disorder. Half of the patients in Veterans Administration hospitals are there for neuropsychiatric reasons.

It's likely to get more before it gets less. VA psychiatrists estimate the present hospital load of 50,000 'NP' patients will rise to a peak of 200,000 in 1975, judging from the experience after World War I. They also figure from a survey of 'NP' pension cases in one eastern state, that perhaps 50 per cent from World War II would benefit from an occasional visit to a psychiatrist - without going to a hospital.

Today's case load of veterans with neuropsychiatric disabilities is sufficiently pressing to give rise to considerable thought to a means of detecting those who will benefit from psychiatric guidance. The need for a valid instrument of personality evaluation to meet the potential neuropsychiatric case load is an obvious criterion for the justification of this study.

The felt need for studies of the validity of group tests of personality posed by psychologists interested in the

^{1/}Greer Williams, "Are You Insane? Well Don't Fret; The Answer Is No", Army Times (February 1, 1947) 26: 9.

of veterans in need of psychiatric guidance is probably well beyond the average lay persons' expectations and the potential value of an instrument for detecting those who are emotionally maladjusted may be suggested by the following report by Greer Williams, special consultant to the Veterans Administration.

The living veterans of World War I and II total around 13,000,000. Nearly 525,000 of them are drawing pensions for neuropsychiatric disability, meaning they have some kind of mental or nervous disorder. Half of the patients in Veterans Administration hospitals are there for neuropsychiatric reasons. It's likely to get more before it gets less. VA psychiatrists estimate the present hospital load of 50,000 'MP' patients will rise to a peak of 200,000 in 1945, judging from the experience after World War I. They also figure from a survey of 'MP' pension cases in one eastern state, that perhaps 50 per cent from World War II would benefit from an occasional visit to a psychiatrist - without going to a hospital.

Today's case load of veterans with neuropsychiatric disabilities is sufficiently pressing to give rise to considerable thought to a means of detecting those who will benefit from psychiatric guidance. The need for a valid instrument of personality evaluation to meet the potential neuropsychiatric case load is an obvious criterion for the justification of this study.

The felt need for studies of the validity of group tests of personality posed by psychologists interested in the

Greer Williams, "Are You Insane? Well Don't fret; The Answer Is No", Army Times (February 1, 1947) 28: 2.

personality evaluation of veterans is based on empirical phenomena. However, their problem is not unique in the field of personality testing, for many test authorities have voiced their opinion of the questionable value of personality tests. Thus the second justification for this study lies in the general need for personality test validation as stressed by Traxler:^{1/}

Probably the greatest single need in personality measurement at the present time is the need for extensive studies of the validity of existing instruments, for very few such tests can be confidently recommended for general school (or other group) use until there is more evidence than is now available that they actually measure what they purport to measure.

The specific need for a validation study of the Bernreuter Personality Inventory is raised by those who use this questionnaire extensively, yet question the duplicity of its scales and the value of the time consumed in its scoring. The final justification for this study is to be found within its results for this study should yield objective evidence that will help to clarify an understanding of the personality traits measured by the Bernreuter Personality Inventory and the most valuable technique of securing these measurements.

^{1/}Arthur E. Traxler, "Measurement in the Field of Personality", Education (March, 1946) 66: 429.

4

personality evaluation of veterans is based on empirical phenomena. However, their problem is not unique in the field of personality testing, for many test authorities have voiced their opinion of the questionable value of personality tests.

Thus the second justification for this study lies in the general need for personality test validation as stressed by

Thurstone:

Probably the greatest single need in personality measurement at the present time is the need for extensive studies of the validity of existing instruments, for very few such tests can be confidently recommended for general school (or other group) use until there is more evidence than is now available that they actually measure what they purport to measure.

The specific need for a validation study of the Bernreuter Personality Inventory is raised by those who use this questionnaire extensively, yet question the duplicity of the scales and the value of the time consumed in its scoring. The final justification for this study is to be found within its results for this study should yield objective evidence that will help to clarify an understanding of the personality traits measured by the Bernreuter Personality Inventory and the most valuable techniques of scoring these measurements.

CHAPTER II
REVIEW OF THE RESEARCH AND DESCRIPTION
OF THE SAMPLE OF THIS STUDY

Reviewing the Literature of
General Personality Evaluation

This investigation of the literature is restricted to reports concerning the non projective techniques of personality evaluation for it is within this area that the Bernreuter Personality Inventory is to be found. A review of the present status of group administered personality questionnaires will also yield information of value in determining the comparative worth of the Bernreuter Personality Inventory. In general most of the existing instruments of personality evaluation have been the object of greater condemnation than praise. It is relatively impossible to find a single instrument of personality measurement that is acceptable to all its users. The opinions of the majority of experts in the area of objective personality assessment are such that little optimism may be developed concerning the use of the instruments now available. Over a period of years the users of objective type personality tests have observed the interpretations of

CHAPTER II

REVIEW OF THE RESEARCH AND DESCRIPTION

OF THE SAMPLE OF THIS STUDY

Reviewing the Literature of General Personality Evaluation

This investigation of the literature is restricted to reports concerning the non projective techniques of personality evaluation for it is within this area that the Bernreuter Personality Inventory is to be found. A review of the present status of group administered personality questionnaires will also yield information of value in determining the comparative worth of the Bernreuter Personality Inventory. In general most of the existing instruments of personality evaluation have been the object of greater condemnation than praise. It is relatively impossible to find a single instrument of personality measurement that is acceptable to all its users. The opinions of the majority of experts in the area of objective personality assessment are such that little optimism may be developed concerning the use of the instruments now available. Over a period of years the users of objective type personality tests have observed the interpretations of

personality tests to be at variance with the known behavior of examinees when the tests have been interpreted with reference to their standard directions. On this subject Traxler^{1/} has written:

The appraisal of personality seems to have a special fascination for nearly everyone. Consequently this field has been, almost since the memory of man, an unusually productive hunting ground for assorted quacks and charlatans.

It was not until recent years that the proponents of objective evaluation turned their attention to the field of personality, but, once test making was begun in this area, personality testing seemed to become open sesame for nearly everyone who could formulate a questionnaire about likes and dislikes, worries, dreams, and suppressed wishes. The result has been that the few worthwhile instruments which have been prepared have been obscured by many tests of inferior quality.

The abundance of paper and pencil type group tests referred to by Traxler is probably largely responsible for the unsavory position in which standardized personality tests have fallen. Undoubtedly many of these instruments have merit and if used judiciously can supply test users with objective evidence of real value. Unfortunately today's market is glutted with tools masked under the guise of personality tests, inventories, questionnaires and rating scales. It is interesting to note that this preponderance of materials has been developed within the past two decades yet have added little to the need for valid instruments of

^{1/}Arthur E. Traxler, "Measurement in the Field of Personality", Education (March, 1946) 66: 424.

personality measurement since 1930. In that year Menninger^{1/} wrote, "No satisfactory means of measuring driving force or emotional possibilities, have yet been devised." Today there is little evidence to suggest that Menninger's statement would not fit the majority of the existing instruments of personality evaluation. For the most part the rapid qualitative advances that have been made in the fields of intelligence and achievement testing have been met quantitatively in the field of personality testing, with the earlier techniques of personality measurement refined, but not necessarily improved. In consequence Freeman^{2/} has written;

Tests of personality have not yet been found as serviceable for routine use by the teacher or school administrator as have tests of mental ability. Their meaning in terms of every day behavior is not so clear. Many of them have turned out to be fairly reliable when given under favorable conditions, but their validity has to be largely taken on faith, and their significance judged on the basis of clinical experience.

Traxler^{3/} voices the same opinion and continues with, "One obstacle to the measurement of personality is that there

^{1/}Karl A. Menninger, The Human Mind. The Literary Guild of America. New York, 1930, p.172.

^{2/}Frank N. Freeman, Mental Tests. The Riverside Press. Cambridge, Mass., Revised Edition, 1939, p.233.

^{3/}Arthur E. Traxler, Techniques of Guidance. Harper & Brothers. New York, 1945, p.99.

personality measurement since 1930. In that year Menninger wrote, "No satisfactory means of measuring driving force or emotional possibilities, have yet been devised." Today there is little evidence to suggest that Menninger's statement would not fit the majority of the existing instruments of personality evaluation. For the most part the rapid qualitative advances that have been made in the fields of intelligence and achievement testing have been not quantitatively in the field of personality testing, with the earlier techniques of personality measurement refined, but not necessarily improved. In consequence Freeman has written:

Tests of personality have not yet been found as serviceable for routine use by the teacher or school administrator as have tests of mental ability. Their meaning in terms of every day behavior is not so clear. Many of them have turned out to be fairly reliable when given under favorable conditions, but their validity has to be largely taken on faith, and their significance judged on the basis of clinical experience.

Traxler voices the same opinion and continues with, "One obstacle to the measurement of personality is that there

W. A. Menninger, The Human Mind, The Literary Guild of America, New York, 1930, p. 142.

Frank M. Freeman, Mental Tests, The Riverside Press, Cambridge, Mass., Revised Edition, 1932, p. 235.

Arthur E. Traxler, Techniques of Guidance, Harper & Brothers, New York, 1945, p. 93.

is not general agreement on a definition of personality, or on the number and nature of the traits of which it is composed." Perhaps there lies within Traxler's observation the very core of the problem of objective personality evaluation. Personality traits are usually propounded on the behavior characteristic of a type of personality. However, a lack of standardization of the types of personality makes it relatively impossible for the test constructors to design their tests with respect to a personality classification acceptable to all the users and interpreters of personality tests. As Cobb^{1/} has pointed out, the typing of mankind has been an accepted evil of each generation. Classifications have arisen with each school of psychology, and the Behaviorists, Gestaltists, Pavlovians, Freudians and Sheldonians have failed to produce universal categories or even a basis for universal classification. If Traxler's statement on the obstacle to the measurement of personality is as important as it appears to be, and if Cobb's observations represent the present status of personality classification, then the development of worth-while instruments of personality evaluation must await a universally acceptable method of personality classification. In the meantime confusion reigns

^{1/}Stanley Cobb, Borderlands of Psychiatry. Harvard University Press. Cambridge, Mass., 1943, p.xiv / 166.

is not general agreement on a definition of personality, or on the number and nature of the traits of which it is composed. Perhaps there lies within Trexler's observation the very core of the problem of objective personality evaluation. Personality traits are usually propounded on the basis of characteristic of a type of personality. However, a lack of standardization of the types of personality makes it relatively impossible for the test constructors to design their tests with respect to a personality classification acceptable to all the users and interpreters of personality tests. As Cobb has pointed out, the typing of mankind has been an accepted evil of each generation. Classifications have arisen with each school of psychology, and the Behaviorists, Gestaltists, Pavlovians, Freudians and Sheldonians have failed to produce universal categories or even a basis for universal classification. If Trexler's statement on the obstacle to the measurement of personality is as important as it appears to be, and if Cobb's observations represent the present status of personality classification, then the development of workable instruments of personality evaluation must await a universally acceptable method of personality classification. In the meantime confusion reigns.

concerning the real value of present day instruments of personality evaluation.

The low repute in which the majority of these instruments are held has been objectively demonstrated by Kornhauser.^{1/} He sent out a questionnaire regarding psychometric devices to reputable American psychologists asking, "In the field of personality testing how satisfactory or helpful for present practical use do you consider Personality Inventories and questionnaires (such as those of Bernreuter, Bell, Humm-Wadsworth, etc.)?" Kornhauser's five catagory responses yielded the following results from his returns:

1. highly satisfactory.....01.5 per cent
2. moderately satisfactory.....13.5 per cent
3. doubtfully satisfactory.....36.0 per cent
4. rather unsatisfactory.....33.0 per cent
5. highly unsatisfactory.....16.0 per cent.

Such a range of opinion, with only fifteen per cent of the established psychologists placing reasonable faith in the available instruments of personality measurement necessitates that further objective evidence of their validity be made available if they are to continue to be used in general testing programs. The value of this study rests in the fact that personality tests are used frequently, and that the many constructors of personality instruments have found a lucra-

^{1/}A. Kornhauser, "Replies of Psychologists to a short questionnaire on Mental Test Developments, Personality Inventories, and the Rorschach Test", Educational and Psychological Measurement (1945) 5: 6.

tive market for the fruits of their labor. The naive acceptance of these instruments by less objective persons than Kornhauser's subjects, and the knowledge that these same tests flourish in the popular field of personality evaluation, have prompted considerable research in the general field of personality test validation. For a direct attack and a thorough summary of this work, the reader is referred to Ellis,^{1/} article on this subject. His concluding statement based on his far reaching study causes one to wonder what sins have been committed in the name of objective personality evaluation. For he states:

We may conclude, therefore, that judging from the validity studies on group administered personality questionnaires thus far reported in the literature, there is at best one chance in two that these tests will validly discriminate between groups of adjusted and maladjusted individuals, and that there is very little indication that they can be safely used to diagnose individual cases or to give valid estimations of the personality traits of specific respondents. The older, more conventional, and more widely used forms of these tests seem to be, for practical diagnostic purposes, hardly worth the paper on which they are printed.

Reviewing the Literature pertaining to
the Bernreuter Personality Inventory

Of the many and diverse tools of personality measurement, the Bernreuter Personality Inventory is the most popular,

1/Albert Ellis, "The Validity of Personality Questionnaires", Psychological Bulletin (September 1946) 43: 425.

most widely used instrument in the field of personality measurement. Traxler^{1/} writing on personality testing states, "The best known and doubtless the most widely used controlled-answer questionnaire for adolescents and adults is the Bernreuter Personality Inventory." In like manner, Greene^{2/} reviewing the Bernreuter Personality Inventory writes, "This is doubtless the most widely applied test of its kind." To these statements may be added the results of Pallister's^{3/} canvass of 74 American psychologists, members of the American Psychological Association specializing in measurement research, which lends objective evidence to the opinions of the experts. Pallister's questionnaire regarding psychometric techniques resulted in proof that the Bernreuter Personality Inventory was the best known test in his canvass. However, popularity per se does not make for the greater validity of an instrument. Also, this multi-trait questionnaire is "one of the older, more conventional and more widely used forms"^{4/} which has been the object of as much if not more adverse comment than the less popular tests of its kind. The intensity with which these

^{1/}Arthur E. Traxler, op. cit., p.103.

^{2/}Edward B. Greene, Measurement of Human Behavior. The Odyssey Press. New York, 1941, p.541.

^{3/}H. Pallister, "American Psychologists Judge fifty-three Vocational Tests", Journal of Applied Psychology (1936) 20: 761-768.

^{4/}Albert Ellis, loc. cit.

criticisms have been made may be derived from reports such as those entitled, "What the Bernreuter Personality Inventory Does Not Measure,"^{1/} and "Personality Traits by Fiat."^{2/}

Yet this instrument has withstood the assaults of the critics for a great many years and continues to be the most widely used test in the field of personality evaluation, though many instruments have been composed and published since Bernreuter edited his inventory. There must be some just cause for its continued use. Some factors must be operating to keep the Bernreuter Personality Inventory in its relative place of prestige, as concerns objective personality testing.

Since its inception the Bernreuter Personality Inventory has had a ready market. Its initial success was undoubtedly traced to the economical need which Bernreuter attempted to meet in measuring more than one personality trait with a single test. Then too, its scales were assigned names, the connotation of whose traits were familiar to the psychologists and educators who hoped to evaluate personality. The interest in and use of the Personality Inventory gained momentum as industrial counselors and vocational advisors

^{1/}R. A. Brotemarkle, "What the Bernreuter Personality Inventory Does Not Measure", Journal of Applied Psychology (October, 1933) 17: 559-563.

^{2/}Irving Lorge, "Personality Traits by Fiat: (Part) I.", Journal of Applied Psychology (April, 1935) 26: 273-278.

joined the ranks of the psychologists and school administrators who were attempting to ascertain the validity of the assumption that the discrepancies between intelligence and achievement test scores and job efficiency could be traced to non-intellectual personality factors. Unfortunately the Bernreuter Personality Inventory was not the exegesis of personality evaluation, and when its practitioners failed to find significant differences in its use, and when psychologists would not agree to the interpretations regarding its results, the Personality Inventory became the object of severe criticism.

Due to its originality in design and the contrary opinions concerning its worth, the Bernreuter Personality Inventory has been the subject of considerable research. Approximately 150 published studies have appeared in the literature since its inception. Such a quantity of individual research projects makes their individual enumeration impractical, and beyond the scope of this report. For a more detailed discussion and summary of these published studies the reader is referred to Super's^{1/} article which reviews the Bernreuter research, and gives the source and author of each study. Many of these original articles from which Super

^{1/}Donald E. Super, "The Bernreuter Personality Inventory: A Review of Research", Psychological Bulletin (February 1942) 39: 94-125.

quotes have been analyzed for their value as concerns the totality of this report. A synthesis of Super's findings shows that:

1. The Bernreuter Personality Inventory has been used in almost every imaginable type of research project in which personality factors play an important part.
2. The results of these studies add to the total information concerning this instrument but do not determine definite situations in which it may be used.
3. For the most part, though profile patterns of trait responses are suggested by the authors as being indicative of one thing or another, significant differences are rarely reported.
4. The Personality Inventory definitely does not measure as many traits as it is purported to measure, and the use of more than three keys is economically and logically unsound.
5. The superiority of Flannagan's or Bernreuter's keys has not been established.
6. Validation studies reporting statistically significant differences and reliable coefficients of correlation using acceptable objective criteria, must continue to be made before the true validity of the Personality Inventory can be accepted with confidence.

quotes have been analyzed for their value as concerns the totality of this report. A synthesis of Super's findings shows that:

1. The Bernreuter Personality Inventory has been used in almost every imaginable type of research project in which personality factors play an important part.
2. The results of these studies add to the total information concerning this instrument but do not determine definite situations in which it may be used.
3. For the most part, though profile patterns of trait responses are suggested by the authors as being indicative of one thing or another, significant differences are rarely reported.
4. The Personality Inventory definitely does not measure as many traits as it is purported to measure, and the use of more than three keys is economically and logically unsound.
5. The superiority of Flanagan's or Bernreuter's keys has not been established.
6. Validation studies reporting statistically significant differences and reliable coefficients of correlation using acceptable objective criteria, must continue to be made before the true validity of the Personality Inventory can be accepted with confidence.

Description of the
Bernreuter Personality Inventory

In 1931 Robert G. Bernreuter,^{1/} a candidate for the degree of Doctor of Philosophy at Stanford University, culminated his doctorate requirements with his dissertation, "The Valuation of a Proposed New Method for Constructing Personality Tests." The new method advanced by Bernreuter was one in which four of the most valid and reliable personality tests, each designed to measure a separate personality trait, were combined in a single instrument for optimal efficiency. This instrument is known today as the Bernreuter Personality Inventory. This 75 item, self administering, 30 minute, questionnaire was originally intended to measure four distinct personality traits by scoring the single test with four separate scales, each representative of a distinct personality trait. The scales were designated: (B1N) a measure of neurotic tendency, (B2S) a measure of self-sufficiency, (B3I) a measure of introversion - extroversion, and (B4D) a measure of dominance - submission.

In 1935 Flannagan^{2/} applied Hotelling's method of

1/Robert G. Bernreuter, "The Valuation of a Proposed New Method for Constructing Personality Tests". Unpublished doctor's thesis, Stanford University, California, 1931.

2/John C. Flannagan, Factor Analysis in the Study of Personality. Stanford University Press. Stanford University, California, 1935, x / 103.

Description of the

Bernreuter Personality Inventory

In 1931 Robert G. Bernreuter, a candidate for the degree of Doctor of Philosophy at Stanford University, culminated his doctorate requirements with his dissertation, "The Valuation of a Proposed New Method for Constructing Personality Tests." The new method advanced by Bernreuter was one in which four of the most valid and reliable personality tests, each designed to measure a separate personality trait, were combined in a single instrument for optimal efficiency. This instrument is known today as the Bernreuter Personality Inventory. This 75 item, self-administering, 30 minute, questionnaire was originally intended to measure four distinct personality traits by scoring the single test with four separate scales, each representative of a distinct personality trait. The scales were designated: (B1M) a measure of neurotic tendency, (B2S) a measure of self-sufficiency, (B3I) a measure of introversion - extroversion, and (B4D) a measure of dominance - submission.

In 1935 Flanagan applied Hotelling's method of

Robert G. Bernreuter, "The Valuation of a Proposed New Method for Constructing Personality Tests". Unpublished doctor's thesis, Stanford University, California, 1931.
 John C. Flanagan, Factor Analysis in the Study of Personality. Stanford University Press, Stanford University, California, 1956, p. 103.

Principal Components to the crude scores of 305 eleventh-grade boys on Bernreuter's four scales, and as a result of further research developed two new scales. These scales, (F1C) a measure of confidence in oneself, and (F2S) a measure of sociability, are claimed by Flannagan to account for 98 per cent of Bernreuter's four factors.

Bernreuter has reported coefficients of reliability calculated by the split - half technique, when corrected, to range from .83 to .88 for the different scales, the mean being .86.

The validity coefficients of correlation were obtained by correlating the Bernreuter scales with the original tests from which the Personality Inventory was constructed. The corrected coefficients range from 1.00 to .99, indicating that the traits measured by the Bernreuter Personality Inventory are identical with the traits which have been measured by previously validated tests.

The Inventory may be scored for any or all six scales and compared by percentile rank with six norm groups:

1. college men
2. college women
3. high school boys
4. high school girls
5. adult men
6. adult women .

The coefficient of correlation found between the B1N, and F1C scales reported as .95, coupled with Flannagan's

statement that the FLC scale accounts for 78 per cent of the total variance of Bernreuter's four factors has led to considerable controversy concerning the wisdom of using one of these scales in preference to the other.^{1/} Statistical evidence does not indicate the superiority of one scale over the other. The only general agreement to the question appears to be that time and effort are wasted in scoring for both of these scales for the same examinee.

The basic aim of this study is to determine whether the BIN or the FLC scale is most valid in measuring emotional adjustment and whether it is practical to use either or both of these scales in the testing of male veterans of World War II.

Description of the Sample

The sample employed in this study consists of 93 male veterans of World War II who entered the services of the United States in perfect mental and physical condition. Following an indeterminate period of active duty in the armed forces, each veteran received an honorable discharge, or a medical discharge resultant of neuropsychiatric disorders. Upon further examination a degree of disability for neuro-

^{1/}Robert G. Bernreuter, Manual for the Personality Inventory. Stanford University Press. Stanford University, Calif., 1935.

statement that the FIC scale accounts for 78 per cent of the total variance of Bernreuter's four factors has led to considerable controversy concerning the wisdom of using one of these scales in preference to the other. ¹ Statistical evidence does not indicate the superiority of one scale over the other. The only general agreement to the question appears to be that time and effort are wasted in scoring for both of these scales for the same examinee.

The basic aim of this study is to determine whether the BIK or the FIC scale is most valid in measuring emotional adjustment and whether it is practical to use either or both of these scales in the testing of male veterans of World War II.

Description of the Sample

The sample employed in this study consists of 93 male veterans of World War II who entered the services of the United States in perfect mental and physical condition. Following an indeterminate period of active duty in the armed forces, each veteran received an honorable discharge, or a medical discharge resultant of neuropsychiatric disorders. Upon further examination a degree of disability for neuro-

psychiatric conditions was arrived at for each veteran. The

total sample of 93 members is composed of:

1. thirty-one veterans rated 10 per cent disabled
2. thirty-one veterans rated 30 per cent disabled
3. thirty-one veterans rated 50 per cent disabled.

Each veteran was individually administered the Bernreuter Personality Inventory on the date of his appointment for counseling with advisors of the Advancement and Guidance Section of the Boston Regional Office of the Veterans Administration. The tests were scored and the raw scores converted to percentile ranks using the male adult norm.

CHAPTER III

PROCEDURES

Random Sampling of the Criterion Population

The method of validating a test or inventory against outside criteria is ordinarily the most objective and acceptable means of determining the validity of the instrument under investigation. That the outside criteria must be valid and above reproach in order that the experimental factor may be evaluated adequately is perhaps the first axiom of experimental research.

The outside criteria employed in this investigation consists of veterans rated for degrees of neuropsychiatric disabilities. However, ratings must not always contain the weaknesses of human judgement and bias. The ratings employed in this study are resultant of an evaluation of unlimited information of social, occupational, educational, preservice, service, post-service, and medical histories of servicemen. The amounts of the percentage of disability arrived at by rating boards composed of professional representatives of the medical and legal professions, refer to the amount of limitation of ability inflicted upon the veteran without any

CHAPTER III

PROCEDURES

Random Sampling of the Criterion Population

The method of validating a test or inventory against

outside criteria is ordinarily the most objective and

acceptable means of determining the validity of the instrument

under investigation. That the outside criteria must be valid

and above research in order that the experimental factor may

be evaluated adequately is perhaps the first axiom of experi-

mental research.

The outside criteria employed in this investigation

consists of veterans rated for degrees of neuropsychiatric

disabilities. However, ratings must not always contain the

weaknesses of human judgment and bias. The ratings employed

in this study are resultant of an evaluation of unlimited

information of social, occupational, educational, pressive,

service, post-service, and medical histories of servicemen.

The amounts of the percentages of disability arrived at by

rating boards composed of professional representatives of the

medical and legal professions, refer to the amount of

limitation of ability inflicted upon the veteran without any

regard to the type of psychoneurosis. The amount of limitation of ability is determined through the use of objective standards for evaluating purposes.

The sample of this study is composed of members possessing an extreme amount of the personality traits purportedly measured by the BLN and FLC scales of Bernreuter's Personality Inventory. Such a sample representative of the population of veterans rated for neuropsychiatric disabilities offers an ideal standard for testing the validity of the scales under investigation. Not only have the members been rated for a neuropsychiatric condition, but the degree of the disability conferred upon each member has been arrived at, through standard, comparable criteria. This factor allows for a refinement of the conventional methods of validity studies and also offers techniques of neoteric significance.

However, valid outside criteria is not in itself enough to insure the reliability of the results of a study such as this. In order to apply validly the statistical techniques of this investigation the problem of random sampling of the outside criteria was considered to be of paramount importance.

Ordinarily the research worker cannot examine every member of the universe under consideration. Therefore he must make some assumptions from a sample of subjects typical of that universe. This method represents no real problem, for logical speculation and empirical statistics show that a

regard to the type of psychoneurosis. The amount of limitation of ability is determined through the use of objective standards for evaluating purposes.

The sample of this study is composed of members possessing an extreme amount of the personality traits purportedly measured by the B10 and B10 scales of Bernreuter's Personality Inventory. Such a sample representative of the population of veterans rated for neuropsychiatric disabilities offers an ideal standard for testing the validity of the scales under investigation. Not only have the members been rated for a neuropsychiatric condition, but the degree of the disability conferred upon each member has been arrived at, through standard, comparable criteria. This factor allows for a refinement of the conventional methods of validity studies and also offers techniques of nescient significance. However, valid outside criteria is not in itself enough to insure the reliability of the results of a study such as this. In order to apply validly the statistical techniques of this investigation the problem of random sampling of the outside criteria was considered to be of paramount importance. Ordinarily the research worker cannot examine every member of the universe under consideration. Therefore he must make some assumptions from a sample of subjects typical of that universe. This method represents no real problem for logical speculation and empirical statistics show that a

sample will yield a great amount of information about the parent universe. The fundamental aims of the theory of sampling are twofold:

1. the estimation of certain constants of the parent universe, from the sample,
2. the determination of the degree of confidence that can be placed in these estimates in terms of probability.

However,.... "all mathematical sampling theory is based finally on the assumption of random selection, and any application of this theory is valid only to the degree, that the samples employed have been so selected."¹

Thus, the estimations applicable to the universe must be resultant of research in which the selection of an individual from the universe is such that each member of the universe has an equal chance of being selected, and that a predetermined number of such members shall compose the sample of that universe.

Such simple random sampling is not always possible. Sometimes, the universe may be divided into strata and then a portion of the sample is taken from each stratum. Therefore, if the design of experimentation necessitates some purposive principle of selection,.... "it is almost always

¹/G. Udny Yule and M. G. Kendall, An Introduction to the Theory of Statistics. Charles Griffin & Co., Ltd. London, Eleventh Edition, 1937, xiii / 570.

sample will yield a great amount of information about the parent universe. The fundamental aim of the theory of sampling are twofold:

1. the estimation of certain constants of the parent universe, from the sample,
2. the determination of the degree of confidence that can be placed in these estimates in terms of probability.

However, "... all mathematical sampling theory is based finally on the assumption of random selection, and any application of this theory is valid only to the degree that the samples employed have been so selected."

Thus, the estimations applicable to the universe must be resultant of research in which the selection of an individual from the universe is such that each member of the universe has an equal chance of being selected, and that a predetermined number of such members shall compose the sample of that universe.

Such simple random sampling is not always possible. Sometimes, the universe may be divided into strata and then a portion of the sample is taken from each stratum. Therefore, if the design of experimentation necessitates some purposive principle of selection, "... it is almost always

possible to provide for random selection and thus to utilize sampling theory in interpreting our results."^{1/} Consequently a method of stratified sampling would allow for random selection within a series of dichotomy of a particular universe.

The Chi Square Test

If one desires to discuss the extent of the relationship between this manifold classification and some other variable, the data can be set out in the form of a table to find the amount of association between the variables under consideration. This method of manifold classification is a simple extension of dichotomy, and the table an extension of four-fold 2 by 2 contingency tables.^{2/} Such a table will allow for the application of the Chi - Square Test (X^2), to determine whether certain experimentally obtained results differ significantly from those to be expected by "chance"; or whether obtained results diverge from some hypothesis to such an extent that the hypothesis should be accepted or rejected. The X^2 method does not yield a coefficient but it does provide a measure of the probability that two sets

^{1/}E. F. Lindquist, Statistical Analysis in Educational Research. Houghton Mifflin Co., The Riverside Press. Cambridge, Mass., 1940, p.25.

^{2/}G. Udny Yule and M. G. Kendall, op. cit., p.65-67.

possible . . . to provide for random selection and thus to utilize sampling theory in interpreting our results. ¹ Consequently a method of stratified sampling would allow for random selection within a series of dichotomy of a particular universe.

The Chi Square Test

If one desires to discuss the extent of the relationship between this manifold classification and some other variable, the data can be set out in the form of a table to find the amount of association between the variables under consideration. This method of manifold classification is a simple extension of dichotomy, and the table an extension of four-fold 2 by 2 contingency tables. ² Such a table will allow for the application of the Chi - square Test (χ^2), to determine whether certain experimentally obtained results differ significantly from those to be expected by "chance"; or whether obtained results diverge from some hypothesis to such an extent that the hypothesis should be accepted or rejected. The χ^2 method does not yield a coefficient but it does provide a measure of the probability that two sets

¹ E. F. Lindquist, Statistical Analysis in Educational Research, Houghton Mifflin Co., The Riverside Press, Cambridge, Mass., 1940, p. 22.

² G. Udry Yule and M. G. Kendall, op. cit., p. 66-67.

of data are dependent or independent.

In computing χ^2 from a contingency table, the independence values (f'_i), or theoretical Frequencies must first be obtained. The theoretical frequency to be expected in any cell is determined by multiplying the number of frequencies in the corresponding row of that cell by the number of frequencies in the corresponding column of that cell, and dividing by the total frequency of the contingency table. The difference between the observed (f_i) and expected values in each cell is squared and divided by the respective independence value of each cell. Chi-square equals the sum of these quotients by formula:^{1/}

$$\chi^2 = \sum \frac{(f_i - f'_i)^2}{f'_i}$$

This value of Chi-square represents the total amount of discrepancy between hypothesis and observation, and allows for the amount of assurance with which the hypothesis may be accepted or rejected.

Through the use of Chi-square tables it is possible to determine the probability with which the obtained value of Chi-square could occur solely by chance. However, entry into a Chi-square table necessitates two statistics; the value of

^{1/}Elmer B. Mode, The Elements of Statistics. Prentice-Hall, Inc. New York, 1945, p.361.

of data are dependent or independent.

In computing χ^2 from a contingency table, the independence values (f_i), or theoretical frequencies must first be obtained. The theoretical frequency to be expected in any cell is determined by multiplying the number of frequencies

in the corresponding row of that cell by the number of

frequencies in the corresponding column of that cell, and

dividing by the total frequency of the contingency table.

The difference between the observed (f_o) and expected values

in each cell is squared and divided by the respective indepen-

dence value of each cell. Chi-square equals the sum of these

$$\chi^2 = \sum \frac{(f_o - f_i)^2}{f_i}$$

This value of Chi-square represents the total amount of dis-

crepancy between hypothesis and observation, and allows for

the amount of assurance with which the hypothesis may be

accepted or rejected.

Through the use of Chi-square tables it is possible to

determine the probability with which the obtained value of

Chi-square could occur solely by chance. However, entry into

a Chi-square table necessitates two statistics; the value of

Chi-square and the number of degrees of freedom (m), the value of which changes with each set of data.^{1/}

Sometimes, the researcher is not as much concerned with the amount of relationship between two or more variables as he is with the difference between them. In discussing the association existent between variables, large samples are invariably investigated to predict universal associations. Often, the interpretation of differences between parameters of sub-universes is predicated upon small sample theory, and represents acceptable statistical technique for the basic aims of the theory of sampling are alike regardless of the size of the sample. However, though the statistical theory of small samples is generally applicable to large samples, the converse is not true.

The statistical theory of large samples allows that the sample values of a parameter will be grouped about the true value, and will differ by comparatively small values from that value. The use of the normal probability integral tables based upon the Gaussian curve is then made possible. This is not true of small samples, for their distribution tends to be leptokurtic in form, approaching a Pearsonian type III curve, thus eliminating directly transferable assumptions concerning position, disposition and other

^{1/}Elmer B. Mode, The Elements of Statistics. Prentice-Hall, Inc. New York, 1945, p.361.

Chi-square and the number of degrees of freedom (m), the value of which changes with each set of data. ¹

Sometimes, the researcher is not as much concerned with the amount of relationship between two or more variables as he is with the difference between them. In discussing the association existing between variables, large samples are invariably investigated to predict universal associations. Often, the investigation of differences between parameters of sub-universes is predicated upon small sample theory, and represents acceptable statistical technique for the basic aims of the theory of sampling are alike regardless of the size of the sample. However, though the statistical theory of small samples is generally applicable to large samples, the converse is not true.

The statistical theory of large samples allows that the sample values of a parameter will be grouped about the true value, and will differ by comparatively small values from that value. The use of the normal probability integral tables based upon the Gaussian curve is then made possible. This is not true of small samples, for their distribution tends to be leptokurtic in form, approaching a Pearsonian type III curve, thus eliminating directly transferable assumptions concerning position, dispersion and other

measurements to the parameters of the universe.

The t Test

Consequently, Fisher's t ratio, first introduced in modified form by a statistician under the nom de plume "Student" is applied to test the difference between the means of small samples.^{1/}

The fiducial limits or the level of confidence within which a statistic may be rejected or accepted in small sample statistics is based upon the "degrees of freedom" which is usually one less than the number of measurements in the sample. This statistic is located in the denominator of the t ratio.

In small sample theory the t ratio is most frequently applied to determine the probability that a difference between means is not the result of chance factors alone, and that the difference is significant at a predetermined fiducial limit.

Values of t, indicative of real differences at the most usable levels of significance have been prepared by Fisher, and are sufficiently accurate to allow for precise interpolation of intermediate probabilities. An examination of these tables shows that the degrees of freedom range from one to thirty, thus suggesting that the normal probability

^{1/}R. A. Fisher, Statistical Methods for Research Workers. Oliver and Boyd. Edinburgh, 1925, p.114-173.

integral table may be used effectively with samples larger than 31 in number.

Thus, the formula to test the significance of the difference between two means, of samples less than 31 in number, whose population variance is unknown is:^{1/}

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sigma'_{\bar{x}_1 - \bar{x}_2}}$$

and Fisher's t distribution with $n = N_1 + N_2 - 2$ when \bar{x}_1 and \bar{x}_2 are the means of the respective samples, and $\sigma'_{\bar{x}_1 - \bar{x}_2}$ is the estimated standard error of the difference of the means.

Whereas, the formula to test the significance of the difference between two means, of samples greater than 31 in number, whose population variance is unknown is:^{2/}

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\left(\frac{s_1^2}{N_2} + \frac{s_2^2}{N_1}\right)^{1/2}}$$

when t is normally distributed, and when \bar{x}_1 and \bar{x}_2 are the means of the respective samples, and $\frac{s_1^2}{N_2}$ and $\frac{s_2^2}{N_1}$ are the sample variances respectively, divided by the number of members of the inverse samples.

In general, Fisher's t distribution may be used for samples drawn from non-normal populations; however if the

^{1/}Elmer B. Mode, "Elements of Statistics II", Unpublished Notes, Boston University (Spring, 1947) p.8.

^{2/}Loc. cit.

integral table may be used effectively with samples larger than 31 in number.

Thus, the formula to test the significance of the difference between two means, of samples less than 31 in number, whose population variance is unknown is:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

and Fisher's t distribution with $n = n_1 + n_2 - 2$ when \bar{x}_1 and \bar{x}_2 are the means of the respective samples, and s_1^2 and s_2^2 are the estimated standard error of the difference of the means. Whereas, the formula to test the significance of the difference between two means, of samples greater than 31 in number, whose population variance is unknown is:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

when t is normally distributed, and when \bar{x}_1 and \bar{x}_2 are the means of the respective samples, and $\frac{s_1^2}{n_1}$ and $\frac{s_2^2}{n_2}$ are the sample variances respectively, divided by the number of members of the inverse samples.

In general, Fisher's t distribution may be used for samples drawn from non-normal populations; however if the

samples are drawn from populations with different variances, i.e., if $\sigma^2_1 \neq \sigma^2_2$, the methods used above may be questioned. Thus, when comparing the means of samples it is often necessary to first determine whether the means of the samples under investigation are of the same universe with respect to their variance, or are of different universes.

The F Test

To estimate the significance of the difference between the variances of samples Fisher showed how the function of z is distributed for pairs of random samples drawn from the same population.

G. W. Snedecor simplified Fisher's method and produced the F test tables^{1/} (similar to those of t) to test the hypothesis that the samples drawn are from equally variable populations. The F test does not deal directly with the difference between the standard deviations but rather with the ratio between the estimates of the true variances. The variance ratio may be defined by:^{2/}

$$F = \frac{\sigma'^2_1}{\sigma'^2_2}$$

^{1/}G. W. Snedecor, Statistical Methods Applied to Experiments in Agriculture and Biology. Collegiate Press. Ames, Iowa, 1938, Table 10.2, p.174-177.

^{2/}Elmer B. Mode, op. cit., p.14.

samples are drawn from populations with different variances, i.e., if $\sigma_1^2 \neq \sigma_2^2$, the methods used above may be questioned. Thus, when comparing the means of samples it is often necessary to first determine whether the means of the samples under investigation are of the same universe with respect to their variance, or are of different universes.

The F Test

To estimate the significance of the difference between the variances of samples Fisher showed how the function of a is distributed for pairs of random samples drawn from the same population.

G. W. Snedecor simplified Fisher's method and produced the F test tables (similar to those of t) to test the hypothesis that the samples drawn are from equally variable populations. The F test does not deal directly with the difference between the standard deviations but rather with the ratio between the estimates of the true variances. The variance ratio may be defined by:

$$F = \frac{\sigma_1^2}{\sigma_2^2}$$

G. W. Snedecor, Statistical Methods Applied to Experiments in Agriculture and Biology, College Press, Ames, Iowa, 1938, Table 10.2, p. 174-177.

W. J. Youden, Statistical Methods for Engineers, p. 14.

where $\sigma_1'^2$ always denotes the larger variance. If $F = 1$, then $\sigma_1'^2 = \sigma_2'^2$; thus, this is the test of the significance of the deviation of a given F from one.

Analysis of Variance

Frequently in educational and psychological research, more than two groups of data are to be examined. To compare individually each group with another is a tedious and often a spurious operation. In such circumstances, Fisher's analysis of variance^{1/} may be applied to any number of samples, to determine whether the samples are sufficiently different from one another to reject the hypothesis that they arose by random sampling of the same universe.

The basic proposition is that for any set of r groups of n cases each, we may, on the hypothesis that all groups are random samples from the same population, derive two independent estimates of the population variance, one of which is based on the variance of group means, the other on the average variance within groups. The test of this hypothesis then consists of determining whether or not the ratio (F) between these estimates lies below the value in the table of F that corresponds to the selected level of significance.^{2/}

Essentially, the F -test applied to between and within groups variance is an application of the t -test to all differences between means, simultaneously. If the difference as indicated by the F ratio is greater than can be attributed to

^{1/}E. F. Lindquist, op. cit., p.87-179.

^{2/}Ibid, p.91.

where σ_1^2 always denotes the larger variance. If $F = 1$, then $\sigma_1^2 = \sigma_2^2$; thus, this is the test of the significance of the deviation of a given F from one.

Analysis of Variance

Frequently in educational and psychological research, more than two groups of data are to be examined. To compare individually each group with another is a tedious and often a spurious operation. In such circumstances, Fisher's analysis of variance¹ may be applied to any number of samples, to determine whether the samples are sufficiently different from one another to reject the hypothesis that they arose by random sampling of the same universe.

The basic proposition is that for any set of r groups of n cases each, we may, on the hypothesis that all groups are random samples from the same population, derive two independent estimates of the population variance, one of which is based on the variance of group means, the other on the average variance within groups. The test of this hypothesis then consists of determining whether or not the ratio (F) between these estimates lies below the value in the table of F that corresponds to the selected level of significance.

Essentially, the F -test applied to between and within groups variance is an application of the t -test to all differences between means, simultaneously. If the difference as indicated by the F ratio is greater than can be attributed to

¹E. F. Lindquist, op. cit., p. 87-150.

²Ibid, p. 81.

chance fluctuations at a predetermined level of significance, it is known that one or more groups under investigation is atypical and is not a member of the parent universe. The F test does not signify that all methods differences are significant, but merely that the groups are not homogenous with respect to the differences of the method means.

The results of the F test determine the plausability of testing the individual differences. Application of the t test will then allow for the isolation of significantly different groups.

However, it must be understood that neither the F test or the t test determine the cause of the real differences. That the differences can not be explained away by chance is a statistical certainty but the factors operating to produce these real differences are not located through statistical technique.

In the final analysis, logical and empirical reasoning become the determiners of causation, though measurement offers the means of attack in the solution of psychological and educational research.

chance fluctuations at a predetermined level of significance, it is known that one or more groups under investigation is atypical and is not a member of the parent universe. The F -test does not signify that all methods differences are significant, but merely that the groups are not homogeneous with respect to the differences of the method means.

The results of the F -test determine the plausibility of testing the individual differences. Application of the t -test will then allow for the isolation of significantly different groups.

However, it must be understood that neither the F -test or the t -test determine the cause of the real differences. That the differences can not be explained away by chance is a statistical certainty but the factors operating to produce these real differences are not located through statistical techniques.

In the final analysis, logical and empirical reasoning become the determinants of causation, though measurement offers the means of attack in the solution of psychological and educational research.

CHAPTER IV

PRESENTATION OF DATA

Probabilities of Association

Pure random sampling of the criterion group was impossible, and its application would necessarily void the value of the degree of neuropsychiatric disability made available from the veteran universe. Thus, a parent universe, composed of three groups of veterans rated for varying degrees of neuropsychiatric disability was selected, as the criterion group. This universe became a manifold dichotomy of male veterans of World War II rated for one of the three most common degrees of neuropsychiatric disability; 10 per cent, 30 per cent and 50 per cent. Such purposiveness did not negate the technique of random selection for each group was considered complete when 31 consecutive veterans rated for the respective degree of psychoneurosis appeared for counseling. No predetermined principal of appointment scheduling was exacted other than the chronological order of the veteran's request for an appointment. The three groups of 31 members each, made up a total sample of 93 members. This composition allowed for the maximum benefit of the techniques of small sample theory yet yielded

a parent universe of sufficient proportions to permit the application of large sample theory.

The form of the criterion group offered a single strata composed of three distinct stratum. By arranging the percentile ranks of the BLN and FLC scales into deciles, it is possible to prepare two contingency tables, one for each scale and the three stratum, representative of 10, 30, and 50 per cent disabled for neuropsychiatric conditions. By computing χ^2 for each of these tables it is then possible to determine whether the three groups of veterans with varying degrees of neuroticism differ significantly with respect to their respective positions in the decile ranks of each scale.

In Table 1 the statistic appearing at the top of each cell is the observed or actual frequency (f_i); the figures in parenthesis represent the independence or theoretical values (f'_i).

In order to determine whether the three groups differ significantly in terms of probability with respect to their positions in decile rank on the BLN scale, it is necessary to compute χ^2 by;^{1/}

$$\chi^2 = \sum \frac{(f_i - f'_i)^2}{f'_i}$$

to yield $\chi^2 = 5.745$.

^{1/}Elmer B. Mode, loc. cit.

a parent universe of sufficient proportions to permit the

application of large sample theory.

The form of the criterion group offered a single strata

composed of three distinct strata. By arranging the per-

centile ranks of the BIV and FIC scales into deciles, it is

possible to prepare two contingency tables, one for each scale

and the three strata, representative of 10, 30, and 50 per cent

disabled for neuropsychiatric conditions. By computing χ^2

for each of these tables it is then possible to determine

whether the three groups of veterans with varying degrees of

neuroticism differ significantly with respect to their respon-

sive positions in the decile ranks of each scale.

In Table I the statistic appearing at the top of each

cell is the observed or actual frequency (f_i); the figures in

parentheses represent the independence or theoretical values

(f_i).

In order to determine whether the three groups differ

significantly in terms of probability with respect to their

positions in decile rank on the BIV scale, it is necessary to

compute χ^2 by

$$\chi^2 = \sum \frac{(f_i - f_i')^2}{f_i'}$$

to yield $\chi^2 = 6.746$.

WELMER B. HOOD, JR., D.D.

Table 1 Comparison of Male World War II Veterans rated for Varying Degrees of Neuroticism and Percentile Ranks with respect to the BLN Scale of the Bernreuter Personality Inventory.

Percentile Ranks	10 Percent Neuro-psychiatric	30 Percent Neuro-psychiatric	50 Percent Neuro-psychiatric	Totals
100	5	5	11	21
91	(7.000)	(7.000)	(7.000)	
90	5	8	5	18
71	(6.000)	(
70	8	8	7	23
51	(7.666)			
50	13	10	8	31
1	(10.333)			
Totals	31	31	31	93

To evaluate χ^2 , it is necessary to enter a Table of χ^2 with the χ^2 value 5.745 and m , the degrees of freedom. In this instance m equals $(4-1)$ $(3-1)$ or 6. For $\chi^2 = 5.745$ and $m = 6$, P is approximately .42.

A probability of 0.42 is so large as to discredit entirely any hypothesis concerning the positive, causative relationship between rated per cents of severity of psychoneurosis and percentile ranks on the BLN scale.

In order to determine whether the three groups differ significantly in terms of probability with respect to percentile rank on the FLC scale, it is necessary to compute χ^2 from Table 2. Again the observed or actual frequencies appear at the top of each cell, and the theoretical or independence values are enclosed in parenthesis.

By formula;

$$\chi^2 = \sum \frac{(f_i - f'_i)^2}{f'_i}$$

$\chi^2 = 7.950$. The degrees of freedom again equal 6.

For $\chi^2 = 7.950$ and $m = 6$, P is approximately .25.

A probability of 0.25 means that there is insufficient evidence to support the hypothesis that the more severe the rated per cent of neuropsychiatric disability the higher the percentile rank of the FLC scale.

The probabilities of 0.42 and 0.25 for the BLN and FLC

To evaluate χ^2 , it is necessary to enter a Table of χ^2 with the χ^2 value 5.745 and m , the degrees of freedom. In this instance m equals $(4-1)(3-1)$ or 6. For $\chi^2 = 5.745$ and $m = 6$, P is approximately .43.

A probability of 0.43 is so large as to discredit entirely any hypothesis concerning the positive, curvilinear relationship between rated per cents of severity of psychoneurosis and percentile ranks on the B10 scale.

In order to determine whether the three groups differ significantly in terms of probability with respect to percentile rank on the B10 scale, it is necessary to compute χ^2 from Table 2. Again the observed or actual frequencies appear at the top of each cell, and the theoretical or independence values are enclosed in parentheses.

$$\chi^2 = \sum \frac{(f_i - t_i)^2}{t_i} \quad \text{By formula:}$$

$\chi^2 = 7.930$. The degrees of freedom again equal 6. For $\chi^2 = 7.930$ and $m = 6$, P is approximately .25. A probability of 0.25 means that there is insufficient evidence to support the hypothesis that the more severe the rated per cent of neuropsychiatric disability the higher the percentile rank of the B10 scale. The probabilities of 0.43 and 0.25 for the B10 and B10

Table 2 Comparison of Male World War II Veterans rated for Varying Degrees of Neuroticism and Percentile Ranks with respect to the FLC Scale of the Bernreuter Personality Inventory.

Percentile Ranks	10 Percent Neuro-psychiatric	30 Percent Neuro-psychiatric	50 Percent Neuro-psychiatric	Totals
100	5	8	11	24
91	(8.000)	(8.000)	(8.000)	
90	6	9	8	23
71	(7.666)			
70	6	8	5	19
51	(6.333)			
50	14	6	7	27
1	(9.000)			
Totals	31	31	31	93

1/ J.P. Guilford, Fundamental Statistics in Psychology and Education, McGraw-Hill Book Company, Inc. New York, 1942, p. 173

2/ Donald E. Super, op. cit., p. 133.

scales respectively are of such magnitude as to allow for their respective x^2 values to occur approximately 42 and 25 times respectively by chance alone in 100 such tests. If the x^2 values indicated that either or both scales differed with respect to percentile rank and severity of neuroticism, it would have been necessary to apply Yates' correction for continuity, but since neither x^2 could be considered significant, the application of Yates' correction was considered impractical. ^{1/}

A logical extension of the results of applying the x^2 test to the data of this study intended that the scale of greater x^2 significance be investigated, further. In this instance, neither P was found to be significant. Consequently, further investigation of either scale was determined on the basis of frequency of use, in order to establish the validity or lack of validity concerning its continued use. Thus, the BLN scale ^{2/} was selected for further investigation, to determine the effectiveness with which it differentiates among groups of veterans rated for neuropsychiatric disabilities of varying degrees of severity; and between the total psychoneurotic group and the normal population.

^{1/} J.P. Guilford, Fundamental Statistics in Psychology and Education. McGraw-Hill Book Company, Inc. New York, 1942, p.173.

^{2/} Donald E. Super, op. cit., p.113.

scales respectively are of such magnitude as to allow for their respective x^2 values to occur approximately 42 and 25 times respectively by chance alone in 100 such tests. If the x^2 values indicated that either or both scales differed with respect to general rank and severity of neuroticism, it would have been necessary to apply Yates' correction for continuity, but since neither x^2 could be considered significant, the application of Yates' correction was considered impractical.

A logical extension of the results of applying the x^2 test to the data of this study intended that the scale of greater x^2 significance be investigated further. In this instance, neither P was found to be significant. Consequently, further investigation of either scale was determined on the basis of frequency of use, in order to establish the validity or lack of validity concerning its continued use. Thus, the BIV scale was selected for further investigation, to determine the effectiveness with which it differentiates among groups of veterans rated for neuropsychiatric disabilities of varying degrees of severity; and between the total psychoneurotic group and the normal population.

J. T. Guilford, Fundamental Statistics in Psychology and Education, McGraw-Hill Book Company, Inc. New York, 1942, p. 173.

W. Donald E. Soper, op. cit., p. 113.

Differences between Variances

The simplest and perhaps most effective method of arriving at the solution of this problem was through the analysis of the variance of the scores of the three distinct samples of the parent neuropsychiatric universe, to determine whether they were actually heterogenous groupings, on merely members of a common aggregate. In this instance, the hypothesis that these were in fact three distinct sub-universes was considered tenable at the 5 per cent level of confidence. This pre-determined level was selected as one allowing sufficient latitude for the exactness with which the instrument under investigation was being tested because the BlN scale was designed to measure neurotic tendency on a single continuum, ranging from wholesome adjustment to emotional instability. The author has made no claim that this instrument will differentiate between varying degrees of neuroticism.

Table 3 depicts the distribution of raw scores for each of the three samples of this study.

Table 4 summarizes the results of the computation necessary in the analysis of the variance of the BlN scores of the groups rated 10 per cent, 30 per cent, and 50 per cent disabled for neuropsychiatric conditions.

Differences between Variance

The simplest and perhaps most effective method of arriving at the solution of this problem was through the analysis of the variance of the scores of the three distinct samples of the parent neuropsychiatric universe, to determine whether they were actually heterogeneous groupings, or merely members of a common aggregate. In this instance, the hypothesis that there were in fact three distinct sub-universes was considered tenable at the 5 per cent level of confidence. This pre-determined level was selected as one allowing sufficient latitude for the exactness with which the instrument under investigation was being tested because the BIN scale was designed to measure neurotic tendency on a single continuum, ranging from whole-some adjustment to emotional instability. The author has made no claim that this instrument will differentiate between varying degrees of neuroticism.

Table 3 depicts the distribution of raw scores for each of the three samples of this study.

Table 4 summarizes the results of the computation necessary in the analysis of the variance of the BIN scores of the groups rated 10 per cent, 30 per cent, and 50 per cent disabled for neuropsychiatric conditions.

Table 3 Raw Scores obtained on the B1N Scale of the Bernreuter Personality Inventory by 93 Male World War II Veterans rated for Neuropsychiatric Disabilities of Varying Degrees of Severity.

B1N	Male World War II Veterans		
Raw Scores	10 Percent Disabled	30 Percent Disabled	50 Percent Disabled
	/ 197	/ 121	/ 194
	/ 107	/ 103	/ 176
	/ 65	/ 77	/ 126
	/ 56	/ 60	/ 126
	/ 40	/ 49	/ 124
	/ 30	/ 42	/ 110
	/ 20	/ 31	/ 103
	/ 20	/ 28	/ 90
	/ 5	/ 25	/ 59
	/ 5	/ 24	/ 59
	- 38	/ 11	/ 53
	- 41	- 12	/ 27
	- 52	- 17	/ 18
	- 58	- 32	- 5
	- 62	- 37	- 6
	- 64	- 42	- 20
	- 64	- 43	- 30
	- 69	- 43	- 34
	- 90	- 47	- 44
	- 91	- 51	- 49
	- 93	- 64	- 51
	- 116	- 82	- 54
	- 120	- 90	- 72
	- 134	- 91	- 79
	- 135	- 103	- 84
	- 140	- 104	- 102
	- 145	- 119	- 130
	- 152	- 122	- 130
	- 173	- 124	- 145
	- 188	- 180	- 150
	- 196	- 207	- 170
Total	- 1676	- 1039	- 90
Mean	- 54.06	- 33.52	- 2.90
Grand Total	- 2805		
Grand Mean	- 30.16		

Table 2
Raw Scores obtained on the BIN Scale of
the Bernier Personality Inventory by
93 Male World War II Veterans rated for
Neuropsychiatric Disabilities of Varying
Degrees of Severity.

BIN			Male World War II Veterans		
Raw Scores			BIN		
10 Percent Disabled			30 Percent Disabled		
50 Percent Disabled			50 Percent Disabled		
197	197	197	197	197	197
107	107	107	107	107	107
65	65	65	65	65	65
56	56	56	56	56	56
40	40	40	40	40	40
30	30	30	30	30	30
20	20	20	20	20	20
5	5	5	5	5	5
5	5	5	5	5	5
33	33	33	33	33	33
41	41	41	41	41	41
52	52	52	52	52	52
68	68	68	68	68	68
63	63	63	63	63	63
64	64	64	64	64	64
64	64	64	64	64	64
69	69	69	69	69	69
90	90	90	90	90	90
91	91	91	91	91	91
92	92	92	92	92	92
118	118	118	118	118	118
120	120	120	120	120	120
134	134	134	134	134	134
138	138	138	138	138	138
140	140	140	140	140	140
148	148	148	148	148	148
152	152	152	152	152	152
173	173	173	173	173	173
188	188	188	188	188	188
198	198	198	198	198	198
Total - 1878			Total - 1878		
Mean - 64.08			Mean - 64.08		
Grand Total - 2808			Grand Total - 2808		
Grand Mean - 30.18			Grand Mean - 30.18		

Table 4. The Analysis of Variance of the
BlN Raw Scores of 10, 30, and 50
per cent Neuropsychiatric Groups

Components	Degrees of freedom	Sums of squares	Variance
Between Groups	2	41097.88	20548.94
Within Groups	90	746106.32	8290.07
Total Group	92	787204.20	

The variance of the group means was found to be 20548.94 and the average variance within the groups 8290.07. These values, considered to be two independent estimates of the population variance, yield a variance ratio to which can be applied Snedecor's F test;^{1/}

$$F = \frac{\sigma'^2 \bar{x}_1}{\sigma'^2 \bar{x}_2}$$

Thus, $F = \frac{20548.94}{8290.07} = 2.478$. For 2 and 90 degrees of freedom the value of F considered to be significant at the 5 per cent level of confidence is 3.10.^{2/}

Obviously the obtained value of F falling below the necessary 3.10 demands that the hypothesis that these are three distinct groups, be rejected. In terms of the BlN scores

^{1/}Elmer B. Mode, op. cit., p.14.

^{2/}G. W. Snedecor, op. cit., p.65.

Table 4.
The Analysis of Variance of the
BIN Raw Scores of 10, 30, and 50
per cent Neuropsychiatric Groups

Components	Degrees of Freedom	Sum of Squares	Variance
Between Groups	2	41027.82	20513.91
Within Groups	90	745106.32	8290.07
Total Group	92	787304.20	

The variance of the group means was found to be 20513.91 and the average variance within the groups 8290.07. These values, considered to be two independent estimates of the population variance, yield a variance ratio to which can be applied Snedecor's F test.

$$F = \frac{\sigma^2_{\bar{x}_1}}{\sigma^2_{\bar{x}_2}}$$

Thus, $F = \frac{20513.91}{8290.07} = 2.476$. For 2 and 90 degrees of freedom the value of F considered to be significant at the 5 per cent level of confidence is 3.10.

Obviously the obtained value of F falling below the necessary 3.10 demands that the hypothesis that there are three distinct groups, be rejected. In terms of the BIN scores

W. W. Snedecor, op. cit., p. 85.
E. R. R. Niles, op. cit., p. 14.

obtained by the members of the neuropsychiatric group rated for varying degrees of severity it must be assumed that they are in fact all members of a homogenous universe.

The test (and B1N scale) author does not submit that the "Neurotic Tendency" scale is capable of differentiating between neurotic individuals of varying degrees of severity. However, he does contend that the scale will select neurotics from the normal population. A test of this fundamental claim should yield proof of the real validity or lack of validity of this instrument, and should meet the requirement of significance at the one per cent confidence limit, for the sole purpose of this scale is to select neurotics from the normal population.

Differences between Means

Student's t test^{1/} allows for the test of the difference between means of small samples. In this instance the total neuropsychiatric universe composed of 93 members, and Bernreuter's normative group composed of 300 members shall constitute the samples of this test.

As N increases, Student's t distribution approaches the normal distribution. Thus, in testing the difference of the means of the above samples whose population variance is unknown, the formula (appearing on page 40) and the normal distribution tables are employed.

^{1/}R. A. Fisher, op. cit., p.125

The data representative of the first sample has been extrapolated from Tables 3 and 4, and the data representative of the second sample has been taken from Bernreuter's Table of Percentile Norms appearing in the Appendix.

By formula:^{1/}

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\left(\frac{s_1^2}{N_2} + \frac{s_2^2}{N_1} \right)^{1/2}}$$

$$t = \frac{-30.16 - -63.9}{\sqrt{\frac{92^2}{300} + \frac{79^2}{93}}}$$

$$t = \frac{33.74}{\sqrt{95.32}} = \frac{33.74}{9.76}$$

to yield the value of t equal to 3.46. Referring to Fisher's Table of t for an infinite number of cases at the 1 per cent confidence limit, $t = 2.576$.^{2/}

The obtained t of 3.46 very definitely meets the stringent requirements of this test at this level of confidence and thus proves real differences existing between the normal population and the neuropsychiatric universe; differences

^{1/}Elmer B. Mode, loc. cit.

^{2/}R. A. Fisher, op. cit., p.174.

The data representative of the first sample has been extrapolated from Tables 3 and 4, and the data representative of the second sample has been taken from Hershner's Table of Percentile Norms appearing in the Appendix.

By formula:

$$f = \frac{\bar{X}_1 - \bar{X}_2}{\left(\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2} \right)^{1/2}}$$

$$f = \frac{-30.16 - -63.9}{\sqrt{\frac{25^2}{300} + \frac{79^2}{93}}}$$

$$f = \frac{33.74}{\sqrt{25.32}} = \frac{33.74}{5.03}$$

to yield the value of t equal to 6.71. Referring to Fisher's Table of t for an infinite number of cases at the 1 per cent confidence limit, $t = 2.576$.

The obtained t of 6.71 very definitely meets the stringent requirements of this test at this level of confidence and thus proves real differences existing between the normal population and the neuropsychiatric universe; differences

Fisher, R. Mode, loc. cit.

R. A. Fisher, op. cit., p. 174.

that can not be explained away by chance fluctuations; differences that do exist and exceed the 1 per cent level of significance. That is, the obtained value of t is such that the probability of the difference between the means of the neuropsychiatric universe and the normal population is so large that it will occur approximately 999 times in 1000 such samples.

An investigation has shown that the majority of group administered personality tests, questionnaires and rating scales are held in low regard by most authorities in the field of personality measurement. The Parson's Personality Inventory, the most popular questionnaire of its kind, falls within the broad category of group administered personality tests and consequently has been the subject of considerable criticism and research concerning its use. A goodly amount of this criticism has centered about the value of using both Parson's scale of "Emotional Tendency" and Flanagan's scale of "Confidence in oneself", in scoring the Personality Inventory. A few authorities suggest the use of both scales. The majority of the rest deplore the use of both scales. The criticism is based upon the fact that these scales measure the same personality traits. However, they are divided in opinion as to which scale is the most valid, for the two scales

CHAPTER V

SUMMARY, CONCLUSIONS, AND LIMITATIONS OF THIS STUDY

Summary

An investigation has shown that the majority of group administered personality tests, questionnaires and rating scales are held in low repute by most authorities in the field of personality measurement. The Bernreuter Personality Inventory, the most popular questionnaire of its kind, falls within the broad category of group administered personality tests and consequently has been the subject of considerable criticism and research concerning its use. A goodly amount of this criticism has centered about the value of using both Bernreuter's scale of "Neurotic Tendency" and Flannagan's scale of "Confidence in oneself", in scoring the Personality Inventory. A few authorities suggest the use of both scales. The majority of the rest deplore the time wasted in scoring both scales because they state that these scales measure the same personality traits. However, they are divided in opinion as to which scale is the most valid, for the BlN scale

is the preferred scale by many authorities although others restrict themselves to the FLC scale. As a result of this diversity of opinion, these two scales were investigated to determine whether either scale is valid for selecting extreme psychoneurotics from the normal population.

Ninety-three male veterans of World War II rated for neuropsychiatric disabilities of varying degrees of severity were randomly selected as the criterion group for this investigation. Percentile ranks on the BIN scale were combined into 5 unequal classes for three divisions of this criterion group, into 31 members rated 10 per cent disabled, 31 members rated 30 per cent disabled and 31 members rated 50 per cent disabled for neuropsychiatric conditions. This dichotomy made possible an estimation of the probability that high percentile ranks on the BIN scale, indicative of emotional maladjustment, are associated with severity of neuroticism. Through the use of the Chi square technique it was determined that $\chi^2 = 5.745$; for 6 degrees of freedom this χ^2 value equals approximately .42 in terms of probability.

In like manner P was computed for percentile ranks on the FLC scale and severity of neuroticism. Chi square equalled 7.950, and $P = .25$. Since neither P was considered significant, the BIN scale was selected for further investigation due to its most frequent use, in the objective evaluation of neuroticism.

is the preferred scale by many authorities although others resist themselves to the FIC scale. As a result of this diversity of opinion, these two scales were investigated to determine whether either scale is valid for selecting extreme psychoneurotics from the normal population.

Ninety-three male veterans of World War II rated for neuropsychiatric disabilities of varying degrees of severity were randomly selected as the criterion group for this investigation. Percentile ranks on the BIN scale were combined into 5 unequal classes for three divisions of this criterion group, into 31 members rated 10 per cent disabled, 31 members rated 50 per cent disabled and 31 members rated 90 per cent disabled for neuropsychiatric conditions. This dichotomy made possible an estimation of the probability that high percentile ranks on the BIN scale, indicative of emotional maladjustment, are associated with severity of neuroticism. Through the use of the Chi square technique it was determined that $\chi^2 = 3.746$; for 2 degrees of freedom this χ^2 value equals approximately .42 in terms of probability.

In like manner P was computed for percentile ranks on the FIC scale and severity of neuroticism. Chi square equalled 7.950, and $P = .02$. Since neither P was considered significant, the BIN scale was selected for further investigation due to its most frequent use, in the objective evaluation of neuroticism.

By application of Fisher's technique of the analysis of the variance of BLN raw scores for the group rated 10 per cent disabled, 30 per cent disabled and 50 per cent disabled for neuropsychiatric conditions, it was possible to determine whether in terms of test scores, they were actually three distinct groups or whether they were really all members of a common aggregate population. The hypothesis that they were three distinct groups was considered tenable at the 5 per cent level of confidence. The resultant F of 2.478 demanded that this hypothesis be rejected.

The final test of the true validity of this scale rested in its ability to differentiate at the 1 per cent level of confidence between normal persons and persons manifesting an extreme degree of the trait purportedly measured by this scale. For purposes of this test, Bernreuter's normative sample of 300 members and the total veteran sample of 93 members rated for neuropsychiatric disabilities were selected. Student's t test of the differences between means was applied to the samples with a value of $t = 3.46$, which easily meets the requirements of this test at the predetermined level of confidence.

4. There appeared to be a greater (though not significant) trend towards an existing relationship between high personality ranks on the MC scale and severity of neuropsychiatric disability.

Conclusion

As a result of this investigation and the statistical techniques applied to the data compiled from the scores on the B1N and F1C scales of Bernreuter's Personality Inventory by male veterans of World War II rated for neuropsychiatric disabilities of varying degrees of severity, the following conclusions may be drawn:

1. Bernreuter's B1N scale, a measure of neurotic tendency, and Flannagan's F1C scale, a measure of confidence in oneself, evaluate the same personality trait or traits with relatively comparable validity. The undesirable extreme of this trait or fusion of traits is one which describes atypical behavior such as that of the nervous, emotionally unstable, neurotic individual.

2. High percentile ranks converted from raw scores on the B1N scale are not related significantly with severity of neuropsychiatric disability.

3. High percentile ranks converted from raw scores on the F1C scale are not related significantly with severity of neuropsychiatric disability.

4. There appears to be a greater (though not significant) trend towards an existing relationship between high percentile ranks on the F1C scale and severity of neuropsychiatric disability.

5. The BIN scale of the Bernreuter Personality Inventory is not capable of differentiating between groups of psychoneurotic individuals rated for neuropsychiatric disabilities of varying degrees of severity, when the test is administered, scored and interpreted according to its standard directions.

6. This scale is sufficiently refined as to allow for the selection of groups of neuropsychiatric individuals from the normal population at the 1 per cent level of confidence. Therefore, the continued use of the BIN scale, a measure of neurotic tendency, is not only justifiable but recommended in the field of personality evaluation.

Limitations of this Study and the Need for Further Research

To date, the majority of research studies in the fields of education and psychology has been limited to small sample theory thus including a greater margin of error than might otherwise be necessary. Usually the researcher is restricted to some method of selective sampling thus limiting the application of the findings of his research to a parent universe composed of identical elements possessed by his sample. This study is no exception. It is not the experimentum crucis in the field of objective personality evaluation. Its findings can not be made applicable to the

total heterogenous universe. However, the results of this study can be applied to the personality testing of the population of 18,000,000 male veterans of World War II, with greater confidence than heretofore experienced.

Traxler,^{1/} referring to the recent production of personality tests stated, "The result has been that the few worthwhile instruments that have been prepared have been obscured by many tests of inferior quality." This study has attempted to validate two scales of a single instrument of personality measurement. As such, this study barely scratches the surface of the problem of separating the few worthwhile instruments from many tests of inferior quality. However, this is a beginning; a beginning from which could be developed a systematic program of validity studies of the existing instruments of personality evaluation in order to determine which tests validly and reliably do what they are purported to do.

This study represents a material contribution to the need for validity studies of objective type personality tests, stressed by many authorities in the field of personality evaluation. Perhaps this contribution will suggest methods of validating tools now enjoying popular useage. A greater

^{1/}Arthur E. Traxler, "Measurement in the Field of Personality", Education (March, 1946) 66: 424

need will be fulfilled if the constructors of personality tests not yet devised will make use of the improved statistical techniques and the advances in personality classification made possible by progressive authorities in the fields of education, psychology and medicine.

Protzman, R. A., "What the Bernreuter Personality Inventory Does Not Measure", Journal of Applied Psychology (October, 1933) 17: 329-333.

Sigmund, Stanley, Borderlands of Psychiatry, Harvard University Press, Cambridge, Mass., 1940, 166 p.

Kille, Albert E., "The Validity of Personality Questionnaires", Psychological Bulletin (September, 1940) 43: 335-440.

Fisher, R. A., Statistical Methods for Research Workers, Oliver and Boyd, Edinburgh, 1925, 307 p.

Flanagan, John C., Factor Analysis in the Study of Personality, Stanford University Press, Stanford University, Calif., 1938, 103p.

Freeman, Frank M., Mental Tests, The Riverside Press, Cambridge, Mass., Revised Edition, 1939, 425 p.

Greene, Edward A., Measurement of Human Behavior, The Grayson Press, New York, 1941, 777 p.

Gullford, J. P., Fundamental Statistics in Psychology and Education, McGraw-Hill Book Co., Inc., New York, 1942, 333 p.

Korthamer, A., "Review of Psychologists to a short questionnaire on Mental Test developments, Personality Inventories, and the Bernreuter Test", Educational and Psychological Measurement (1943) 2: 5-10.

Ligowski, E. P., Statistical Analysis in Educational Research, Houghton Mifflin Co., The Riverside Press, Cambridge, Mass., 1940, 320 p.

BIBLIOGRAPHY

Bernreuter, Robert G., Manual for the Personality Inventory, Stanford University Press, Stanford University, Calif., 1935.

_____, "The Valuation of a Proposed New Method for Constructing Personality Tests", Unpublished doctor's thesis, Stanford University, Calif., 1931.

Brotemarkle, R. A., "What the Bernreuter Personality Inventory Does Not Measure", Journal of Applied Psychology (October, 1933) 17: 559-563.

Cobb, Stanley, Borderlands of Psychiatry, Harvard University Press, Cambridge, Mass., 1943, 166 p.

Ellis, Albert E., "The Validity of Personality Questionnaires", Psychological Bulletin (September, 1946) 43: 385-440.

Fisher, R. A., Statistical Methods for Research Workers, Oliver and Boyd, Edinburgh, 1925, 307 p.

Flannagan, John C., Factor Analysis in the Study of Personality, Stanford University Press, Stanford University, Calif., 1935, 103p.

Freeman, Frank N., Mental Tests, The Riverside Press, Cambridge, Mass., Revised Edition, 1939, 460 p.

Greene, Edward B., Measurement of Human Behavior, The Odyssey Press, New York, 1941, 777 p.

Guilford, J. P., Fundamental Statistics in Psychology and Education, McGraw-Hill Book Co., Inc., New York, 1942, 333 p.

Kornhauser, A., "Replies of Psychologists to a short questionnaire on Mental Test Developments, Personality Inventories, and the Rorschach Test", Educational and Psychological Measurement (1945) 5: 3-15.

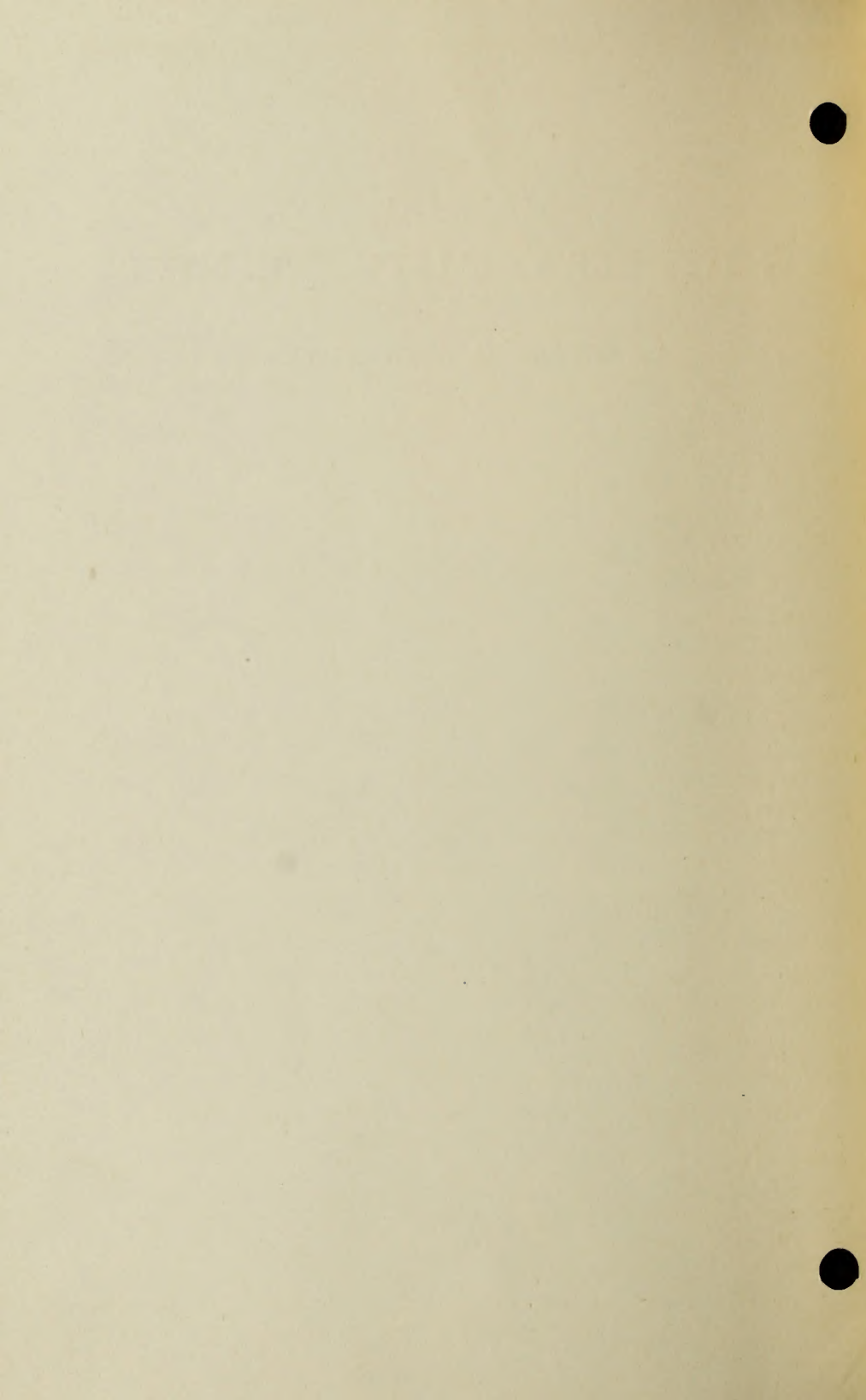
Lindquist, E. F., Statistical Analysis in Educational Research, Houghton Mifflin Co., The Riverside Press, Cambridge, Mass., 1940, 266 p.

BIBLIOGRAPHY

- Lorge, Irving, "Personality Traits by Fiat: (Part) I", Journal of Applied Psychology (April, 1935) 26: 273-278.
- Menninger, Karl A., The Human Mind, The Literary Guild of America, New York, 1930, 447 p.
- Mode, Elmer B., Elements of Statistics II, Unpublished Notes, Boston University, (Spring, 1947) 15 p.
- _____, The Elements of Statistics, Prentice-Hall Inc., New York, 1945, 378 p.
- Pallister, H., "American Psychologists Judge fifty-three Vocational Tests", Journal of Applied Psychology, 1936, 20: 761-768.
- Snedecor, G. W., Statistical Methods Applied to Experiments in Agriculture and Biology, Collegiate Press, Ames, Iowa, 1938, 422 p.
- Super, Donald E., "The Bernreuter Personality Inventory: A Review of Research", Psychological Bulletin (February, 1942) 39: 94-125.
- Traxler, Arthur E., "Measurements In the Field of Personality", Education (March, 1946) 66: 424-429.
- _____, Techniques of Guidance, Harper & Brothers, New York, 1945, 394 p.
- Williams, Greer, "Are You Insane? Well Don't Fret; The Answer Is No", Army Times (February 1, 1947) 26: p. 9.
- Yule, G. Udny, and Kendall, M. G., An Introduction to the Theory of Statistics, Charles Griffin & Co., Ltd., London, Eleventh Edition, 1937, 570 p.

**MANUAL
FOR THE PERSONALITY INVENTORY**

By **ROBERT G. BERNREUTER**



MANUAL FOR THE PERSONALITY INVENTORY

By ROBERT G. BERNREUTER

(Scales F1-C and F2-S have been prepared by John C. Flanagan)

Copyright 1935 by the Board of Trustees of the Leland Stanford Junior University

Published by STANFORD UNIVERSITY PRESS, Stanford University, California

The Personality Inventory represents a new departure in the measurement of personality in that it measures several different aspects at one time. The immediate effect of this is a very considerable saving both in cost and in the time required for administration. The facts that the nature of the traits being measured is not readily detectable and that the scales possess high reliability, which permits their being used to compare one individual with another, are further distinct advantages.

Six scales have been prepared and are now available. These are designated by the symbols B1-N, B2-S, B3-I, B4-D, F1-C, and F2-S, and may be briefly described as follows:

B1-N. A measure of neurotic tendency. Persons scoring high on this scale tend to be emotionally unstable. Those scoring above the 98 percentile would probably benefit from psychiatric or medical advice. Those scoring low tend to be very well balanced emotionally.

B2-S. A measure of self-sufficiency. Persons scoring high on this scale prefer to be alone, rarely ask for sympathy or encouragement, and tend to ignore the advice of others. Those scoring low dislike solitude and often seek advice and encouragement.

B3-I. A measure of introversion-extroversion. Persons scoring high on this scale tend to be introverted; that is, they are imaginative and tend to live within themselves. Scores above the 98 percentile bear the same significance as do similar scores on the B1-N scale. Those scoring low are extroverted; that is, they rarely worry, seldom suffer emotional upsets, and rarely substitute day dreaming for action.

B4-D. A measure of dominance-submission.* Persons scoring high on this scale tend to dominate others in face-to-face situations. Those scoring low tend to be submissive.

F1-C. A measure of confidence in oneself. Persons scoring high on this scale tend to be hamperingly self-conscious and to have feelings of inferiority; those scoring above the 98 percentile would probably benefit from psychiatric or medical advice. Those scoring low tend to be wholesomely self-confident and to be very well adjusted to their environment.

F2-S. A measure of sociability. Persons scoring high on this scale tend to be non-social, solitary, or independent. Those scoring low tend to be sociable and gregarious.

The Personality Inventory may be scored on each of these six scales. However, the substantial correlations of the various scales as shown in Tables III, IV, and V indicate that for many purposes the use of a smaller number of scales would be satisfactory. For example, the high correlation

* The items in this test which measure Dominance-Submission are based upon the Ascendancy-Submission Reaction Study by Gordon W. and Floyd H. Allport and are used by permission of and special arrangements with the publishers, Houghton Mifflin Company.

between B1-N for neurosis and B3-I for introversion would seem to make it unnecessary to employ both of these "B" scales in ordinary situations.

To obtain the maximum information from this inventory two new scales, F1-C and F2-S, have been constructed. The technique of revision is given later in this manual and is fully presented in J. C. Flanagan, *Factor Analysis in the Study of Personality*, 103 pages photolith, Stanford University Press, 1935, \$1.25.

Thus it is possible to score the *Inventory* using any combination of the six desired by the examiner and applying appropriately the information given in Table III, below.

RANGE OF USEFULNESS

The blank has been used successfully with high-school students, with college students, and with adults. It is suitable for use with either sex. Percentile norms, which enable the layman to know how he compares with others, have been prepared for these three groups. An Individual Report Sheet is also available which depicts graphically how the individual compares with others of the same sex and group. This sheet is self-explanatory in that directions for reading it and the significance of each scale on it are explained in non-technical language.

INSTRUCTIONS FOR GIVING

1. *The Inventory is self-administering.* No instructions are necessary except those appearing on the blank. To insure the careful reading of the instructions, the examiner should read them aloud while the individuals being tested are reading them silently.

2. *Each person should interpret the questions for himself.* The examiner must not explain how *he* thinks a question should be interpreted; doing so can only result in invalidating the item. However, in the case of young or relatively uneducated subjects it probably is permissible to explain the meanings of the words which are not understood, *provided the examiner can do so without thereby prejudicing the answer of the subject.*

3. *There are no time limits.* Very few subjects will require more than 25 minutes to complete the *Inventory*.

4. *The importance of thorough co-operation.* Accurate results should be expected only when the subject is willing to co-operate thoroughly. The examiner should be careful to point out that the value of the results to the subject himself is dependent upon his own sincerity, and, further, should guarantee the confidential treatment of the findings.

5. *The exact nature of the traits being measured should not be revealed before the subjects have finished.* However, to avoid any air of mysteriousness it is well to state that "various aspects of personality" are being measured.

INSTRUCTIONS FOR SCORING

Six separate scoring keys are used in the scoring, one for each trait tested. In the preparation of these keys the diagnostic value of each response to each question was determined for each of the traits. Weights from plus 7 to minus 7 were assigned in accordance with these diagnostic values. The total score for a trait is the algebraic sum of the weights which

correspond to the responses made by the individual, as given on the key for that particular trait. In accordance with the instructions appearing on the *Inventory*, if an individual fails to answer a question it should be scored as though he had encircled the question mark.

There are several methods available for determining the sum of these weights:

1. The weights corresponding to each response which the subject has encircled may be written on the blank. These may then be summed to obtain the total score.

2. Many clerks, although not all, are able to total the weights mentally without writing them down. Such a procedure is very much more rapid than the other.

3. The most satisfactory method has been devised by Strong for use with the *Vocational Interest Blank* (*Manual for the Vocational Interest Blank*, Stanford University Press). Two Veeder counters are used (Nos. ZD-18-T and ZD-8-T, manufactured by the Veeder Manufacturing Company, Hartford, Conn.). These are fastened on a thin board with the levers adjacent. As the weights are read from the key, the index finger is used to tally the plus weights on the left-hand counter, the middle finger to tally the minus weights on the right-hand one. This is by far the most rapid method.

In order that the scores may be intelligible to the layman it is suggested that the total score be converted into percentile scores, for which purpose norms are provided. A percentile score indicates what proportion of the group an individual exceeds in the given measure. For example, a percentile score of 64 indicates that this individual has earned a score for neurosis, for self-sufficiency, for introversion, or for dominance, depending upon the scale used, which is higher than the scores earned by 64 per cent of the group with whom he is being compared.

A table is provided on the cover of the *Inventory* to facilitate the computation of the total scores and the percentile scores. Beneath this table is provided a device for indicating the group upon which the percentile scores are based. The group used should be indicated by encircling or underlining the proper symbols.

INSTRUCTIONS FOR USING THE INDIVIDUAL REPORT SHEET

1. Before filling out the Individual Report Sheet the total scores should be transmuted into percentile scores.

2. A separate column should be used for each score.

3. The symbols for the scales (B1-N, B2-S, etc.) should be written at the tops of the respective columns.

4. The percentile scores should be written in the spaces at the bottoms of the columns.

5. The percentile scores should be indicated on the columns by short dashes or cross marks.

6. A "profile" should be made by drawing a line from the score on one column to the one on the next column.

7. The group upon which the percentile scores were computed (high-school students, college students, or adults) should be written in the blank spaces provided.

RELIABILITY

The coefficients of reliability for each scale are reported in Table I. These were computed by using the split-half method and applying the Spearman-Brown prophecy formula. The subjects for the "B" scales were students in two separate classes of elementary psychology at Stanford University. The students in the fall-quarter class were part of the group used in computing the scoring weights; the data from the winter-quarter class were collected from entirely new students after the scoring weights had been computed. The subjects for the "F" scales were eleventh-grade boys in a number of high schools in the suburban Boston area.

TABLE I.—COEFFICIENTS OF RELIABILITY

	Stanford University Fall Quarter Class N = 70	Elementary Psychology Students Winter Quarter Class N = 128	High-School Boys N = 100
B1-N	.91	.88	
B2-S	.92	.85	
B3-I	.89	.85	
B4-D	.89	.88	
F1-C			.86
F2-S			.78

VALIDITY

Coefficients of correlation, both before and after being corrected for attenuation, are presented in Table II. They indicate that the four traits measured by *The Personality Inventory* are identical with four traits which have been measured by previously validated tests. These are the *Thurstone Neurotic Inventory* (TN), the *Bernreuter Self-sufficiency Test* (SS), the *Laird C2 Introversiion Test* (C2), and the *Allport Ascendancy-Submission Reaction Study* (AS). In the construction of *The Personality Inventory* these four tests were used to locate individuals who possessed the various traits to an extreme degree. The weights on the scoring keys were computed on the basis of the extent to which each question differentiated between the criterion groups composed of these extreme individuals.

TABLE II.—COEFFICIENTS OF VALIDITY

Stanford University Elementary Psychology Students

	Fall Quarter Class			Winter Quarter Class		
	N	Uncorr.	Corr.	N	Uncorr.	Corr.
B1-N and TN	70	.94	1.00	32	.91	.99
B2-S and SS	70	.89	1.00	46	.86	1.00
B3-I and C2	70	.76	.99	44	.69	.92
B4-D and AS (Men)	55	.81	1.00	55	.67	.84
B4-D and AS (Women)	29	.82	.99

INTERCORRELATIONS

In Table III are reported the coefficients of correlation found between the various scales. It shows that the intercorrelations between the B1-N, B3-I, and F1-C scales are very high. Little is gained through using more than one of these three scales. If the "B" scales are used, B1-N is probably to be preferred over B3-I, because it has a higher reliability.

TABLE III.—COEFFICIENTS OF INTERCORRELATION
The Pennsylvania State College (Men) Engineering Students

	N = 157				
	B2-S	B3-I	B4-D	F1-C	F2-S
B1-N	— .37	.95	— .80	.95	.32
B2-S		— .31	.47	— .54	.60
B3-I			— .69	.90	.39
B4-D				— .88	.07
F1-C					.11

TECHNIQUE OF REVISION USED BY FLANAGAN*

The basic technique used in obtaining the "F" scales was Hotelling's Method of Principal Components. The original data consisted of the intercorrelations between the scores made by 305 eleventh-grade boys on the four scales of the *Bernreuter Personality Inventory*. These intercorrelations were obtained so as to eliminate the effect of the correlation between "errors." The application of Hotelling's Method to this matrix gave the factor loadings shown in Table IV.

TABLE IV.—WEIGHTS OF FOUR SCALES OF THE "BERNREUTER PERSONALITY INVENTORY"
IN THE FIRST TWO FACTORS OBTAINED BY HOTELLING'S METHOD

Scale	Factor		
	I	II	III-IV
Neurotic Tendency	.887	.228	$\sqrt{-.023}$
Self-Sufficiency	— .594	.648	.167
Introversion-Extroversion	.858	.321	.084
Dominance-Submission	— .833	.112	.358

It will be seen that the first factor accounts for 78 per cent, the second for 18 per cent, and the remaining two for 4 per cent of the total variance of the four factors. Since the first two factors account for practically all of the individual variability, the items of the inventory were re-evaluated in terms of these two factors. The intercorrelation of the scores made by a new group of 100 eleventh-grade boys on the two revised scales was .04. Thus the two new measures are practically independent.

* For full presentation, see J. C. Flanagan, *Factor Analysis in the Study of Personality*, 103 pages photolith, Stanford University Press, 1935, \$1.25.

RELATIONS TO "B" SCALES

It should be noted that close approximations to the individual scores for the four original scales may be obtained from the two revised scales by means of the following simple relations:

$$B1-N = .89(F1-C) + .23(F2-S) - 26$$

$$B2-S = -.48(F1-C) + .53(F2-S) + 18$$

$$B3-I = .69(F1-C) + .26(F2-S) - 1$$

$$B4-D = -.71(F1-C) + .09(F2-S) + 23$$

The coefficients of correlation between the actual scores on the B scales and those estimated from the two "F" scales are given in Table V. These were obtained from a group other than that on which the scales were revised, a group consisting of 100 eleventh-grade boys in the high schools of the suburban Boston area.

TABLE V.—CORRELATION BETWEEN SCORES OBTAINED ON THE FOUR ORIGINAL SCALES AND SCORES ESTIMATED FROM THE TWO REVISED SCALES

B1-N	Neurotic Tendency	.970
B2-S	Self-Sufficiency	.867
B3-I	Introversion	.954
B4-D	Dominance-Submission	.867

COMMUNICATIONS

The author will be glad to supply further information regarding the use of the *Inventory* or the interpretation of results. Communications should be addressed in care of the Department of Psychology, Pennsylvania State College, State College, Pennsylvania. Business communications should be addressed to the publisher.

PRICE SCALES

Package lots, complete with manual, six scales, and percentile norms: 25 copies, \$1.75; 100 copies, \$5.50; 500 copies, \$25.00; 1000 copies, \$40.00. Address Stanford University Press, Stanford University, California.

THE PERSONALITY INVENTORY

By ROBERT G. BERNREUTER

PUBLISHED BY
STANFORD UNIVERSITY PRESS
STANFORD UNIVERSITY, CALIFORNIA

Date.....

NAME..... Age..... Sex.....

Address.....

Name of school..... School grade.....
or business firm..... or occupation

	B1-N	B2-S	B3-I	B4-D	F1-C	F2-S
Plus						
Minus						
Difference						
Percentile	%	%	%	%	%	%

H.S.—COLL.—ADULT

Based on

norms

MALE—FEMALE

Copyright 1935 by the Board of Trustees of the
Leland Stanford Junior University

All rights reserved

The questions on this blank are intended to indicate your interests and attitudes. It is not an intelligence test, nor are there any right or wrong answers.

In front of each question you will find: "Yes No ?"

If your answer is "Yes," draw a circle around the "Yes." If your answer is "No," draw a circle around the "No." If you are entirely unable to answer either "Yes" or "No" to the question, then draw a circle around the question mark.

-
1. Yes No ? Does it make you uncomfortable to be "different" or unconventional?
 2. Yes No ? Do you day-dream frequently?
 3. Yes No ? Do you usually work things out for yourself rather than get someone to show you?
 4. Yes No ? Have you ever crossed the street to avoid meeting some person?
 5. Yes No ? Can you stand criticism without feeling hurt?
 6. Yes No ? Do you ever give money to beggars?
 7. Yes No ? Do you prefer to associate with people who are younger than yourself?
 8. Yes No ? Do you often feel just miserable?
 9. Yes No ? Do you dislike finding your way about in strange places?
 10. Yes No ? Are you easily discouraged when the opinions of others differ from your own?
 11. Yes No ? Do you try to get your own way even if you have to fight for it?
 12. Yes No ? Do you blush very often?
 13. Yes No ? Do athletics interest you more than intellectual affairs?
 14. Yes No ? Do you consider yourself a rather nervous person?
 15. Yes No ? Do you usually object when a person steps in front of you in a line of people?
 16. Yes No ? Have you ever tried to argue or bluff your way past a guard or doorman?
 17. Yes No ? Are you much affected by the praise or blame of many people?
 18. Yes No ? Are you touchy on various subjects?
 19. Yes No ? Do you frequently argue over prices with tradesmen or junkmen?
 20. Yes No ? Do you feel self-conscious in the presence of superiors in the academic or business world?
 21. Yes No ? Do ideas often run through your head so that you cannot sleep?
 22. Yes No ? Are you slow in making decisions?
 23. Yes No ? Do you think you could become so absorbed in creative work that you would not notice a lack of intimate friends?
 24. Yes No ? Are you troubled with shyness?
 25. Yes No ? Are you inclined to study the motives of other people carefully?
 26. Yes No ? Do you frequently feel grouchy?
 27. Yes No ? Do your interests change rapidly?
 28. Yes No ? Are you very talkative at social gatherings?
 29. Yes No ? Do you ever heckle or question a public speaker?
 30. Yes No ? Do you very much mind taking back articles you have purchased at stores?
 31. Yes No ? Do you see more fun or humor in things when you are in a group than when alone?
 32. Yes No ? Do you prefer travelling with someone who will make all the necessary arrangements to the adventure of travelling alone?
 33. Yes No ? Would you rather work for yourself than carry out the program of a superior whom you respect?
 34. Yes No ? Can you usually express yourself better in speech than in writing?
 35. Yes No ? Would you dislike any work which might take you into isolation for a few years, such as forest ranging, etc.?
 36. Yes No ? Have you ever solicited funds for a cause in which you were interested?
 37. Yes No ? Do you usually try to avoid dictatorial or "bossy" people?
 38. Yes No ? Do you find conversation more helpful in formulating your ideas than reading?

39. Yes No ? Do you worry too long over humiliating experiences?
40. Yes No ? Have you ever organized any clubs, teams, or other groups on your own initiative?
41. Yes No ? If you see an accident do you quickly take an active part in giving aid?
42. Yes No ? Do you get stage fright?
43. Yes No ? Do you like to bear responsibilities alone?
44. Yes No ? Have books been more entertaining to you than companions?
45. Yes No ? Have you ever had spells of dizziness?
46. Yes No ? Do jeers humiliate you even when you know you are right?
47. Yes No ? Do you want someone to be with you when you receive bad news?
48. Yes No ? Does it bother you to have people watch you at work even when you do it well?
49. Yes No ? Do you often experience periods of loneliness?
50. Yes No ? Do you usually try to avoid arguments?
51. Yes No ? Are your feelings easily hurt?
52. Yes No ? Do you usually prefer to do your own planning alone rather than with others?
53. Yes No ? Do you find that telling others of your own personal good news is the greatest part of the enjoyment of it?
54. Yes No ? Do you often feel lonesome when you are with other people?
55. Yes No ? Are you thrifty and careful about making loans?
56. Yes No ? Are you careful not to say things to hurt other people's feelings?
57. Yes No ? Are you easily moved to tears?
58. Yes No ? Do you ever complain to the waiter when you are served inferior or poorly prepared food?
59. Yes No ? Do you find it difficult to speak in public?
60. Yes No ? Do you ever rewrite your letters before mailing them?
61. Yes No ? Do you usually enjoy spending an evening alone?
62. Yes No ? Do you make new friends easily?
63. Yes No ? If you are dining out do you prefer to have someone else order dinner for you?
64. Yes No ? Do you usually feel a great deal of hesitancy over borrowing an article from an acquaintance?
65. Yes No ? Are you greatly embarrassed if you have greeted a stranger whom you have mistaken for an acquaintance?
66. Yes No ? Do you find it difficult to get rid of a salesman?
67. Yes No ? Do people ever come to you for advice?
68. Yes No ? Do you usually ignore the feelings of others when accomplishing some end which is important to you?
69. Yes No ? Do you often find that you cannot make up your mind until the time for action has passed?
70. Yes No ? Do you especially like to have attention from acquaintances when you are ill?
71. Yes No ? Do you experience many pleasant or unpleasant moods?
72. Yes No ? Are you troubled with feelings of inferiority?
73. Yes No ? Does some particularly useless thought keep coming into your mind to bother you?
74. Yes No ? Do you ever upbraid a workman who fails to have your work done on time?
75. Yes No ? Are you able to play your best in a game or contest against an opponent who is greatly superior to you?
76. Yes No ? Have you frequently appeared as a lecturer or entertainer before groups of people?
77. Yes No ? Are people sometimes successful in taking advantage of you?
78. Yes No ? When you are in low spirits do you try to find someone to cheer you up?
79. Yes No ? Can you usually understand a problem better by studying it out alone than by discussing it with others?
80. Yes No ? Do you lack self-confidence?
81. Yes No ? Does admiration gratify you more than achievement?
82. Yes No ? Are you willing to take a chance alone in a situation of doubtful outcome?
83. Yes No ? Does your ambition need occasional stimulation through contact with successful people?

84. Yes No ? Do you usually avoid asking advice?
85. Yes No ? Do you consider the observance of social customs and manners an essential aspect of life?
86. Yes No ? If you are spending an evening in the company of other people do you usually let someone else decide upon the entertainment?
87. Yes No ? Do you take the responsibility for introducing people at a party?
88. Yes No ? If you came late to a meeting would you rather stand than take a front seat?
89. Yes No ? Do you like to get many views from others before making an important decision?
90. Yes No ? Do you try to treat a domineering person the same as he treats you?
91. Yes No ? Does your mind often wander so badly that you lose track of what you are doing?
92. Yes No ? Do you ever argue a point with an older person whom you respect?
93. Yes No ? Do you have difficulty in making up your mind for yourself?
94. Yes No ? Do you ever take the lead to enliven a dull party?
95. Yes No ? Would you "have it out" with a person who spread untrue rumors about you?
96. Yes No ? At a reception or tea do you feel reluctant to meet the most important person present?
97. Yes No ? Do you find that people are more stimulating to you than anything else?
98. Yes No ? Do you prefer a play to a dance?
99. Yes No ? Do you tend to be radical in your political, religious, or social beliefs?
100. Yes No ? Do you prefer to be alone at times of emotional stress?
101. Yes No ? Do you usually prefer to work with others?
102. Yes No ? Do you usually work better when you are praised?
103. Yes No ? Do you have difficulty in starting a conversation with a stranger?
104. Yes No ? Do your feelings alternate between happiness and sadness without apparent reason?
105. Yes No ? Are you systematic in caring for your personal property?
106. Yes No ? Do you worry over possible misfortunes?
107. Yes No ? Do you usually prefer to keep your feelings to yourself?
108. Yes No ? Can you stick to a tiresome task for a long time without someone prodding or encouraging you?
109. Yes No ? Do you get as many ideas at the time of reading a book as you do from a discussion of it afterward?
110. Yes No ? Do you usually face your troubles alone without seeking help?
111. Yes No ? Have you been the recognized leader (president, captain, chairman) of a group within the last five years?
112. Yes No ? Do you prefer making hurried decisions alone?
113. Yes No ? If you were hiking with a group of people, where none of you knew the way, would you probably let someone else take the full responsibility for guiding the party?
114. Yes No ? Are you troubled with the idea that people on the street are watching you?
115. Yes No ? Are you often in a state of excitement?
116. Yes No ? Are you considered to be critical of other people?
117. Yes No ? Do you usually try to take added responsibilities on yourself?
118. Yes No ? Do you keep in the background at social functions?
119. Yes No ? Do you greatly dislike being told how you should do things?
120. Yes No ? Do you feel that marriage is essential to your present or future happiness?
121. Yes No ? Do you like to be with people a great deal?
122. Yes No ? Can you be optimistic when others about you are greatly depressed?
123. Yes No ? Does discipline make you discontented?
124. Yes No ? Are you usually considered to be indifferent to the opposite sex?
125. Yes No ? Would you feel very self-conscious if you had to volunteer an idea to start a discussion among a group of people?

THE PERSONALITY INVENTORY

By ROBERT G. BERNREUTER

Published by STANFORD UNIVERSITY PRESS, Stanford University, California

TENTATIVE PERCENTILE NORMS

October, 1938

This revision of the norms replaces all previous issues, and will be sent free on request to users of *The Personality Inventory*.

To find the percentile score, first find the raw score in the set of norms that corresponds to the subject's sex and school status. Then follow across, horizontally, to the scale on which the raw score was earned (B1-N, B2-S, etc.). The value in this column, opposite the raw score, is the percentile score. It will be necessary to interpolate whenever the raw score does not end in either five or zero.

The symbols used have the following meanings:

N. = number of cases used in computing the norms.

M. = arithmetical average (mean) of the distribution of scores.

S.D. = standard deviation of the distribution of scores.

The author will appreciate receiving any additional data which users of the test may send him for the further revision of these norms. Material addressed to him at Stanford University Press will be forwarded.

COLLEGE MEN

RAW SCORE	B1-N N=656	B2-S N=658	B3-I N=651	B4-D N=631	F1-O N=273	F2-S N=273
196						
190						
185						
180						
175						
170				99		
165				98	99	
160	99			98	99	
155	98			97	99	
150	98			97	98	
145	98	99		96	98	
140	97	98		96	98	
135	97	98		94	98	
130	97	97		92	97	
125	96	96		90	97	
120	96	96		88	97	
115	96	94		86	96	99
110	95	93		84	96	98
105	95	92		82	95	98
100	95	91		80	95	97
95	94	90	99	77	94	97
90	94	89	99	75	93	96
85	94	87	98	73	92	96
80	93	85	98	70	91	95
75	93	83	97	67	91	95
70	92	80	96	64	90	94
65	92	77	95	61	89	93
60	91	74	94	58	89	92
55	91	71	93	55	88	91
50	90	68	92	52	87	90
45	89	64	91	49	86	89
40	88	61	90	46	85	88
35	86	57	88	43	84	86
30	85	53	86	40	83	84
25	83	50	83	37	82	82
20	82	46	81	35	81	80
15	80	42	78	33	80	78
10	79	38	76	31	78	75
5	77	35	73	28	76	72
0	76	31	70	25	74	69
-5	74	27	67	22	72	66
-10	72	24	64	19	70	63
-15	70	21	61	17	68	60
-20	69	18	57	15	66	56
-25	68	16	53	13	64	52
-30	66	14	50	12	62	48
-35	64	12	47	11	60	44
-40	62	10	43	10	58	40
-45	60	9	39	9	56	37
-50	58	8	35	8	54	33
-55	56	6	31	7	52	30
-60	54	5	27	6	50	27
-65	52	4	24	5	48	24
-70	50	3	21	5	46	22
-75	48	3	17	4	44	20
-80	45	2	14	4	41	18
-85	42	2	11	4	38	16
-90	39	1	8	3	35	14
-95	38		6	3	33	12
-100	34		4	3	30	10
-105	31		2	2	28	8
-110	29		2	2	26	7
-115	26		1	2	24	6
-120	24			1	22	5
-125	22			1	20	4
-130	20				19	3
-135	18				18	3
-140	16				16	2
-145	14				14	2
-150	12				12	2
-155	10				10	2
-160	9				8	1
-165	8				7	
-170	7				6	
-175	6				5	
-180	5				4	
-185	4				3	
-190	3				2	
-195	2				1	
-200	1					
M. =	-57.3	27.0	-25.6	45.9	-51.5	-25.9
S.D. =	82.2	52.8	49.6	65.6	83.6	50.4

COLLEGE WOMEN

RAW SCORE	B1-N N=544	B2-S N=391	B3-I N=386	B4-D N=396	F1-C N=144	F2-S N=144
195					99	
190					99	
185					98	
180					98	
175					98	
170					98	
165					97	
160					97	
155					97	
150				99	96	
145				98	95	
140				97	94	
135	99	99		96	93	
130	98	96		95	92	
125	98	98		94	91	
120	98	98		93	90	
115	97	97		92	89	99
110	97	96		90	88	99
105	96	95		88	87	98
100	96	94		86	86	98
95	95	93		84	85	97
90	95	92	99	81	84	97
85	94	91	98	79	83	96
80	94	90	98	76	82	96
75	93	89	97	73	80	95
70	93	87	98	70	78	95
65	92	85	95	67	76	94
60	91	83	93	64	74	94
55	90	81	91	62	72	93
50	88	79	89	60	70	92
45	86	76	87	58	68	91
40	85	73	85	56	66	90
35	84	70	83	52	64	88
30	82	67	81	48	60	86
25	80	64	79	45	58	84
20	78	60	76	43	56	82
15	76	56	73	41	54	80
10	74	52	70	39	52	78
5	72	49	66	36	50	75
0	71	45	62	33	48	72
-5	69	41	58	30	46	70
-10	67	38	54	27	44	67
-15	65	35	50	24	42	64
-20	62	31	46	22	40	61
-25	59	28	42	20	38	58
-30	56	25	38	18	36	54
-35	51	23	34	16	34	49
-40	49	20	30	14	28	45
-45	47	17	27	12	26	40
-50	45	15	24	10	24	37
-55	43	13	21	9	22	34
-60	41	11	18	8	20	31
-65	39	9	15	7	18	27
-70	37	7	12	6	16	24
-75	35	6	11	5	14	21
-80	33	5	9	4	13	19
-85	30	4	7	3	12	17
-90	28	3	5	2	11	15
-95	25	3	4	2	10	13
-100	23	2	3	1	9	11
-105	21	2	2		8	9
-110	19	1	1		7	7
-115	17				6	6
-120	16				5	5
-125	15				4	4
-130	13				3	3
-135	12				3	3
-140	10				2	2
-145	8				2	2
-150	6				2	2
-155	5				2	1
-160	4				1	1
-165	3				1	
-170	2					
-175	2					
-180	2					
-185	1					
M. =	-42.8	6.8	-14.7	30.6	8.7	-31.1
S.D. =	76.8	54.2	47.8	61.8	75.1	56.4

HIGH SCHOOL BOYS

RAW SCORE	B1-N N=145	B2-S N=186	B3-I N=187	B4-D N=186	F1-C N=200	F2-S N=200
245					99	
240					98	
235					98	
230					98	
225					98	
220					98	
215					98	
210					98	
205					98	
200					97	
195					97	
190					97	
185					97	
180					96	
175					96	
170					96	
165					95	
160					95	
155					95	
150					94	
145				99	94	
140				98	94	
135				97	93	
130		99		96	93	
125	99	98		95	93	99
120	98	97		93	92	98
115	98	96		91	92	98
110	98	95		89	91	98
105	97	94		87	91	97
100	97	93		85	90	97
95	97	92		83	89	96
90	96	91	99	81	88	95
85	96	91	98	78	87	94
80	95	90	98	76	86	93
75	95	89	97	74	85	92
70	94	88	97	72	84	91
65	94	86	96	70	83	90
60	93	82	96	67	82	89
55	93	78	95	63	81	88
50	92	74	94	59	79	87
45	92	70	93	55	78	85
40	91	66	92	51	76	83
35	90	62	91	47	74	81
30	88	58	90	43	72	79
25	86	54	89	39	70	77
20	84	50	87	35	68	74
15	82	46	85	31	66	71
10	80	42	82	28	64	68
5	78	38	79	25	62	65
0	76	34	76	23	60	61
-5	74	30	73	21	58	58
-10	72	26	70	19	57	55
-15	70	22	67	17	56	51
-20	69	19	64	15	54	47
-25	67	17	60	13	52	44
-30	66	15	56	11	49	41
-35	64	13	52	10	46	38
-40	62	11	48	9	44	35
-45	60	9	44	8	42	32
-50	57	7	40	7	40	29
-55	54	6	36	6	37	26
-60	51	5	32	5	34	23
-65	49	4	28	4	32	20
-70	47	3	24	3	30	17
-75	45	3	20	3	28	14
-80	42	2	16	2	27	13
-85	40	2	12	2	25	12
-90	38	2	8	2	22	11
-95	35	1	6	1	20	10
-100	33		4		18	9
-105	31		3		16	8
-110	29		2		14	7
-115	27		1		12	6
-120	24				11	5
-125	22				10	4
-130	20				9	4
-135	18				8	3
-140	16				7	3
-145	14				6	2
-150	12				6	2
-155	10				5	2
-160	8				4	1
-165	6				3	
-170	5				3	
-175	4				2	
-180	3				2	
-185	2				2	
-190	1				1	
M. =	-60.2	19.5	-32.5	38.5	-14.5	-16.1
S.D. =	75.4	48.4	46.6	54.8	92.8	62.1

HIGH SCHOOL GIRLS

RAW SCORE	B1-N N=121	B2-S N=160	B3-I N=160	B4-D N=160
245				
240				
235				
230				
225				
220				
215				
210				
205				
200				
195				
190				
185				
180				
175				
170				
165				
160				
155				
150				
145				
140				
135	99			99
130	98			98
125	97			97
120	96	99		96
115	95	98		95
110	94	97		94
105	93	96		93
100	92	95		92
95	91	94		91
90	89	93	99	89
85	88	92	98	88
80	86	91	98	86
75	85	90	97	85
70	84	89	96	84
65	83	87	95	83
60	82	85	93	82
55	81	83	91	81
50	80	81	89	80
45	78	79	87	78
40	76	77	85	76
35	74	75	83	74
30	72	72	81	72
25	71	69	79	71
20	69	66	76	69
15	67	63	73	67
10	65	60	70	65
5	63	57	66	63
0	61	53	62	61
-5	59	50	58	59
-10	57	47	54	57
-15	55	44	50	55
-20	53	41	46	53
-25	50	38	42	50
-30	48	35	38	48
-35	46	32	34	46
-40	44	28	30	44
-45	42	25	27	42
-50	40	22	24	40
-55	38	19	21	38
-60	36	16	18	36
-65	34	13	15	34
-70	32	11	12	32
-75	30	10	11	30
-80	27	9	9	27
-85	24	7	7	24
-90	22	5	5	22
-95	19	4	4	19
-100	17	3	3	17
-105	14	2	2	14
-110	12	1	1	12
-115	10			10
-120	8			8
-125	7			7
-130	6			6
-135	5			5
-140	4			4
-145	4			4
-150	3			3
-155	3			3
-160	2			2
-165	2			2
-170	1			1
M. =	-22.9	-2.4	-11.4	10.3
S. D. =	78.2	56.6	47.6	59.6

ADULT MEN

RAW SCORE	B1-N N=300	B2-S N=310	B3-I N=99	B4-D N=311	F1-C N=914	F2-S N=914
245						
240						
235						
230						
225						
220						
215						
210						
205						
200						
195						
190						
185						
180					99	
175					99	
170					99	
165				99	99	
160				98	99	
155				97	99	
150				96	99	
145		99		95	98	
140		98		93	98	99
135		98		91	98	99
130		98		89	98	99
125		97		87	98	99
120	99	96		85	97	98
115	98	95		83	97	98
110	98	94		81	97	98
105	97	93		79	96	97
100	97	92		77	96	96
95	96	90		74	95	95
90	96	88		72	94	94
85	95	86		69	93	93
80	95	84	99	66	93	92
75	94	81	98	63	92	91
70	94	78	97	60	91	89
65	93	75	96	56	90	88
60	92	71	95	52	90	86
55	91	67	94	49	89	84
50	90	63	93	46	88	80
45	89	59	92	43	87	77
40	88	55	90	41	86	74
35	87	51	88	38	85	72
30	86	47	86	35	84	70
25	85	43	84	32	82	68
20	84	39	82	29	81	65
15	83	35	80	26	80	62
10	82	32	77	23	79	59
5	80	29	74	20	78	55
0	78	26	71	18	76	52
-5	77	23	68	16	74	48
-10	75	20	65	14	72	45
-15	73	17	62	12	71	42
-20	72	15	58	10	70	39
-25	70	13	55	9	68	35
-30	68	11	52	8	66	32
-35	66	9	49	7	64	28
-40	64	8	46	6	62	24
-45	62	7	43	5	60	21
-50	60	6	40	5	57	18
-55	58	5	36	4	55	15
-60	56	4	32	4	52	12
-65	54	3	28	3	49	10
-70	52	3	24	3	46	8
-75	50	2	20	2	44	7
-80	47	2	16	2	41	6
-85	44	1	13	1	38	5
-90	41		10		35	4
-95	39		8		32	4
-100	36		6		30	3
-105	33		5		28	2
-110	31		4		26	2
-115	29		3		23	2
-120	26		2		21	1
-125	24		1		19	1
-130	22				18	1
-135	20				16	1
-140	18				14	1
-145	16				12	1
-150	14				11	1
-155	12				10	
-160	10				9	
-165	8				8	
-170	6				6	
-175	5				4	
-180	4				3	
-185	3				2	
-190	2				1	
-195	2				1	
-200	1				1	
M. =	-63.9	32.3	-28.4	53.9	-53.4	0.2
S. D. =	79.0	50.0	50.4	58.0	81.4	55.6

ADULT WOMEN

RAW SCORE	B1-N N=377	B2-S N=367	B3-I N=126	B4-D N=371	F1-C N=848	F2-S N=848
245					99	
240					99	
235					99	
230					99	
225					99	
220					99	
215					99	
210					99	
205					98	
200					98	
195					98	
190					97	
185					97	
180					97	
175					96	
170					96	
165					96	
160					96	
155					95	
150				99	95	
145	99			98	94	
140	98			98	93	
135	98	99		97	92	
130	97	98		97	92	
125	97	97		96	91	
120	96	97		95	90	
115	96	96		94	89	
110	95	96		93	88	99
105	95	95		92	87	99
100	94	94	99	91	85	98
95	93	93	98	89	84	98
90	92	92	98	87	83	97
85	91	91	97	85	82	96
80	90	90	96	83	81	95
75	89	89	95	81	80	94
70	88	88	94	79	78	93
65	87	87	93	77	76	92
60	86	85	92	75	75	91
55	84	83	91	72	73	90
50	82	80	90	69	72	89
45	80	77	89	66	71	87
40	78	74	88	64	69	85
35	76	71	87	62	67	83
30	74	68	85	59	65	81
25	73	65	83	56	63	78
20	71	62	80	53	61	76
15	69	59	76	50	59	73
10	68	56	72	46	57	70
5	66	53	68	43	55	67
0	64	50	63	40	53	64
-5	62	46	59	36	51	61
-10	59	43	55	33	48	57
-15	56	39	51	30	46	54
-20	53	36	47	27	44	51
-25	51	33	43	24	42	48
-30	49	30	39	22	40	44
-35	47	27	36	20	38	40
-40	45	23	32	18	36	36
-45	43	19	28	16	34	33
-50	41	16	24	13	32	30
-55	39	14	20	11	30	27
-60	37	13	17	10	28	24
-65	35	12	14	9	26	21
-70	33	10	11	8	24	18
-75	31	8	8	7	22	16
-80	29	7	6	6	20	13
-85	27	6	5	5	18	10
-90	25	5	4	4	16	8
-95	23	4	3	3	14	7
-100	21	3	2	3	13	5
-105	19	2	2	2	12	4
-110	18	2	1	2	11	4
-115	16	1		1	10	3
-120	14				9	3
-125	12				8	2
-130	11				7	2
-135	9				6	1
-140	7				5	1
-145	6				4	1
-150	4				3	1
-155	4				2	1
-160	3				2	
-165	3				1	
-170	2				1	
-175	2				1	
-180	1				1	
M. =	-27.6	8.2	-15.8	18.4	-1.0	-18.8
S. D. =	79.2	56.8	46.6	63.0	90.0	54.7

F1-C
1-38

F1-C
39-83

F1-C
84-125

F1-C

The Personality Inventory

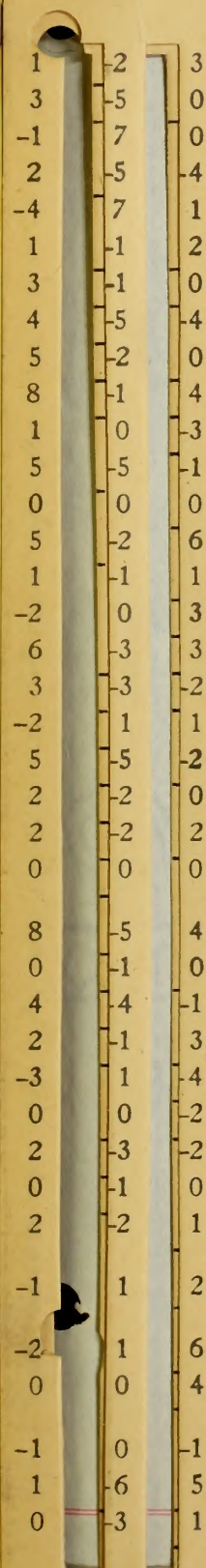
By ROBERT G. BERNREUTER

Stanford University Press
Publishers

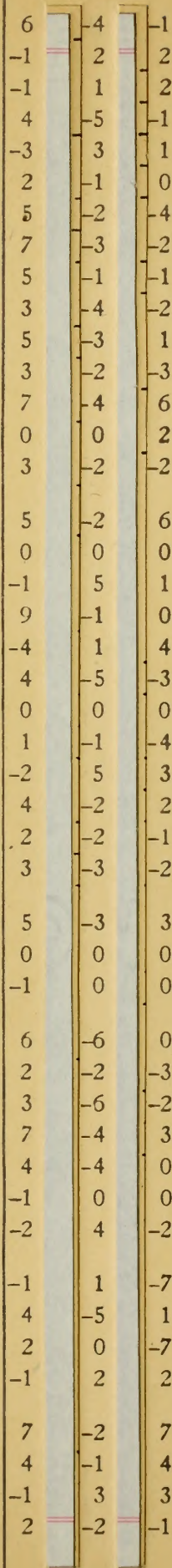
The total score is the algebraic sum of the values which correspond to the encircled responses.

In accordance with the instructions on the blank, a question that is unanswered should be scored as though the question mark had been encircled.

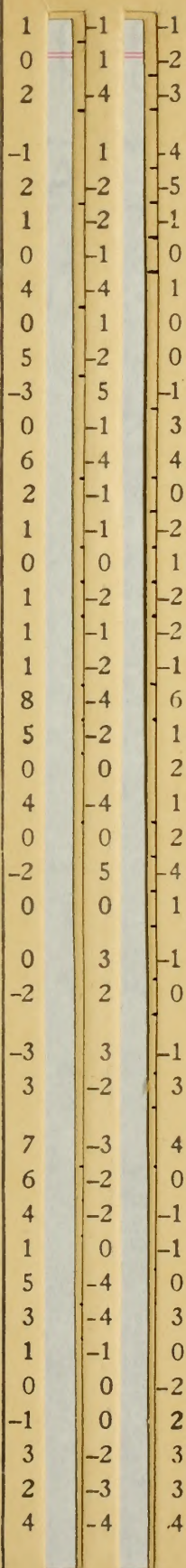
To facilitate scoring, the key should be cut into three strips as shown. The key may then be placed directly over the columns of responses, the "Yes" column being seen to the left of the strips, the "No" and the "?" columns being seen through the slots.



CUT APART ON THIS LINE



CUT APART ON THIS LINE



CUT APART ON THIS LINE

B1-N
1-38

B1-N
39-83

B1-N
84-125

B1-N

The Personality Inventory

By ROBERT G. BERNREUTER

Stanford University Press
Publishers

The total score is the algebraic sum of the values which correspond to the encircled responses.

In accordance with the instructions on the blank, a question that is unanswered should be scored as though the question mark had been encircled.

To facilitate scoring, the key should be cut into three strips as shown. The key may then be placed directly over the columns of responses, the "Yes" column being seen to the left of the strips, the "No" and the "?" columns being seen through the slots.

CUT APART ON THIS LINE

CUT APART ON THIS LINE

CUT APART ON THIS LINE

2	-2	0
5	-4	-2
-2	2	0
2	-2	0
-6	5	2
1	-1	-1
3	-1	-1
7	-7	0
1	-1	-2
3	-3	-1
-1	1	-1
3	-3	0
-1	1	-2
4	-4	1
-1	1	-1
-2	2	-1
3	-2	-2
4	-3	-2
-1	-1	3
4	-3	-1
3	-3	0
3	-2	-3
2	-2	1
6	-7	1
2	-1	-2
3	-3	0
3	-2	-1
-1	1	-1
1	-1	-1
3	-3	0
0	-1	1
1	0	-1
0	1	-2
-2	2	-2
-1	1	-1
-1	1	0
1	-1	-2
0	1	-1

5	-7	2
-2	2	-2
-2	2	-1
4	-3	-1
-1	2	-2
3	-2	-1
4	-4	0
3	-2	-1
1	0	-1
4	-3	1
4	-3	0
0	1	-2
7	-7	2
-1	1	-1
2	-2	1
4	-5	1
-2	2	0
-1	1	1
3	-3	1
-1	2	-2
3	-3	-2
1	-1	0
1	-1	-1
-2	3	-2
1	-1	-1
1	-1	1
4	-4	-1
2	-2	1
-2	3	-1
1	-1	-3
4	-4	1
1	-1	-1
3	-2	-2
6	-6	-1
7	-7	1
-2	2	-1
-1	2	-1
1	-1	1
2	-3	-1
-1	1	-1
-1	1	-1
5	-4	0
3	-3	1
-1	2	-2
1	-1	-3

1	-1	1
-1	1	-3
2	-1	-1
-2	3	-2
3	-2	-1
1	1	-2
0	1	-1
3	-3	2
-1	0	2
3	-3	0
-2	3	-1
-1	1	0
4	-3	-1
-2	3	-2
1	-1	-1
1	-1	-1
2	-2	-1
-1	1	1
2	-1	-3
3	-2	-1
7	-7	0
-2	2	0
6	-5	-3
1	0	-1
-2	3	-1
-1	1	-1
-1	1	-1
-2	2	-2
-1	1	-2
2	-1	-3
5	-4	-2
3	-3	1
1	-2	1
0	1	-1
4	-2	-1
2	-2	0
-1	1	0
-2	2	2
-2	3	0
3	-3	-2
2	-2	1
3	-2	-2



EFFICIENCY BOND

100% AG CONTENT

A.P. & P. CO.

EFFICIENCY BOND

100% AG CONTENT

A.P. & P. CO.

EFFICIENCY BOND

100% AG CONTENT

A.P. & P. CO.

OFFICE OF THE

COMMISSIONER OF

THE LAND OFFICE

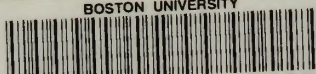
SECTION

OF THE

LAND

OFFICE

BOSTON UNIVERSITY



1 1719 02544 6602



ACCOPRESS BINDER

BF 250-P7

MADE BY
ACCO PRODUCTS, INC.
LONG ISLAND CITY, N.Y., U.S.A.

